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Southern Africa Regional Highway Management System Study

Final Report

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TABLE OF CONTENTS

<i>Executive Summary</i>	X-1
<i>Chapter 1 Introduction</i>	
<i>1 1 Background</i>	1-1
1 1 1 Overview of the Road Sector in SADC	1-1
1 1 2 Road Surface Deterioration and Economic Impacts	1-2
<i>1 2 Objectives of the Study</i>	1-3
<i>1 3 Task Description</i>	1-3
<i>1 4 Key Research Issues Investigated</i>	1-4
<i>1 5 Research Methodology</i>	1-4
1 5 1 Field Studies	1-5
<i>1 6 Organization of Report</i>	1-6
 <i>Chapter 2 Principles and Issues of Road Management</i>	
<i>2 1 Introduction</i>	2-1
<i>2 2 Key Issues Related to Road Systems and Highway Maintenance Management</i>	2-1
2 2 1 Current Conditions	2-1
2 2 2 Primary Areas for Improvement	2-2
2 2 3 Maintenance Improvement Strategies	2-3
2 2 4 Standards	2-4
2 2 5 Overload Control/Traffic Management	2-5
2 2 6 Legal and Regulatory Requirements	2-6
2 2 7 Budget Problems	2-7
2 2 8 Cost Recovery and Financing	2-7
2 2 9 Earmarking Revenues for Highway	2-8
<i>2 3 Institutional Issues - Road Management Initiative</i>	2-8
2 3 1 History/Background	2-8
2 3 2 Key Principles of RMI	2-9
2 3 3 Basic Elements of RMI	2-9
2 3 4 Implementation of RMI in the SADC Region	2-11
<i>2 4 SATCC Initiatives</i>	2-11
 <i>Chapter 3 Institutional Structures</i>	
<i>3 1 Introduction</i>	3-1
<i>3 2 Road Authorities and other Operating Administrative Frameworks</i>	3-1
<i>3 3 Country Reports - Road Administration</i>	3-3
3 3 1 Botswana	3-3
3 3 2 Malawi	3-4
3 3 3 Mozambique	3-5
3 3 4 South Africa	3-6
3 3 5 Tanzania	3-7

3 3 6	Zambia	3-7
3 3 7	Zimbabwe	3-8
3 4	<i>National Roads Boards</i>	3-9
3 5	<i>Country Reports - National Road Boards</i>	3-10
3 5 1	Botswana	3-10
3 5 2	Malawi	3-11
3 5 3	Mozambique	3-11
3 5 4	South Africa	3-11
3 5 5	Tanzania	3-11
3 5 6	Zambia	3-12
3 5 7	Zimbabwe	3-13
3 6	<i>National Road Funds</i>	3-13
3 7	<i>Country Reports - National Road Funds</i>	3-16
3 7 1	Botswana	3-16
3 7 2	Malawi	3-17
3 7 3	Mozambique	3-17
3 7 4	South Africa	3-18
3 7 7	Tanzania	3-18
3 7 6	Zambia	3-19
3 7 7	Zimbabwe	3-19
3 8	<i>Role of the Private Sector</i>	3-20
3 9	<i>Findings and Conclusions</i>	3-22
3 9 1	Institutional Framework	3-22
3 9 2	Policy and Financial Constraints	3-23
3 9 3	Administrative Constraints	3-23
3 9 4	Technical and Managerial Capacity Constraints	3-23
3 9 5	Construction Industry Capacity Constraints	3-24
<i>Chapter 4 Legal and Regulatory Framework</i>		
4 1	<i>Introduction</i>	4-1
4 2	<i>Country Reports - Legislative and Regulatory Frameworks</i>	4-3
4 2 1	Botswana	4-3
4 2 2	Malawi	4-4
4 2 3	Mozambique	4-5
4 2 4	South Africa	4-5
4 2 5	Tanzania	4-6
4 2 6	Zambia	4-6
4 2 7	Zimbabwe	4-6
4 3	<i>SADC Protocols on Transportation and Communication</i>	4-7
4 4	<i>Findings and Conclusions</i>	4-8

Chapter 5 Highway Management Systems		
5 1	<i>Introduction</i>	5-1
5 1 1	The SATCC Group of Experts on Road Infrastructure	5-1
5 1 2	Proposed HMS Features and Standards	5-2
5 2	<i>Country Reports - Highway Management Systems</i>	5-3
5 2 1	Botswana	5-3
5 2 2	Malawi	5-4
5 2 3	Mozambique	5-4
5 2 4	South Africa	5-5
5 2 5	Tanzania	5-5
5 2 6	Zambia	5-6
5 2 7	Zimbabwe	5-7
5 3	<i>Regional Road Management Information Systems</i>	5-7
5 3 1	RRMIS Systems Features and Implantation	5-7
5 4	<i>Findings and Conclusions</i>	5-8
5 5	<i>Recommendations</i>	5-8
 Chapter 6 Heavy Vehicles Weight Management Systems		
6 1	<i>Introduction</i>	6-1
6 1 1	Heavy Vehicles Weight Management Systems Country Comparisons	6-1
6 1 2	Vehicle Axle-load and Gross Vehicle Mass Standards	6-2
6 2	<i>Country Reports - Heavy Weight Management Systems</i>	6-4
6 2 1	Botswana	6-4
6 2 2	Malawi	6-4
6 2 3	Mozambique	6-5
6 2 4	South Africa	6-5
6 2 5	Tanzania	6-6
6 2 6	Zambia	6-7
6 2 7	Zimbabwe	6-7
6 3	<i>Incidence of Overloading</i>	6-7
6 3 1	Enforcement	6-8
6 3 2	Sanctions and Penalties	6-8
6 4	<i>Regional Institutions and Heavy Weight Management</i>	6-8
6 4 1	Preferential Trade Area	6-8
6 4 2	SATCC	6-9
6 5	<i>Findings and Conclusions</i>	6-11
6 6	<i>Recommendations</i>	6-11
 Chapter 7 Cost Recovery Systems		
7 1	<i>Introduction</i>	7-1
7 2	<i>Road Pricing and Recovery Systems</i>	7-2
7 3	<i>Country Reports - Cost Recovery Systems</i>	7-4
7 3 1	Botswana	7-4

7 3 2	Malawi	7-4
7 3 3	Mozambique	7-5
7 3 4	South Africa	7-5
7 3 5	Tanzania	7-6
7 3 6	Zambia	7-7
7 3 7	Zimbabwe	7-7
7 4	<i>Road Pricing Policies and Estimation Methods</i>	7-8
7 4 1	SATCC	7-8
7 4 2	COMESA/PTA	7-9
7 5	<i>Regional Road Pricing and Estimation Methodology</i>	7-9
7 6	<i>Regional Road Fund</i>	7-10
7 7	<i>Inter-modal Competition</i>	7-11
7 8	<i>Findings and Conclusions</i>	7-12
7 9	<i>Recommendations</i>	7-13

Chapter 8 Recommended Actions to Improve Regional Highway Management

8 1	<i>Background</i>	8-1
8 2	<i>Recommended Actions</i>	8-1
8 3	<i>Implementation of Recommended Actions</i>	8-2
8 3 1	Issues Pertinent to Heavy Vehicle Weight Management Systems	8-2
8 3 2	Issues Pertinent to the Internet-Resident Road Definition Standards Manual	8-4
8 4	<i>Project Recommendations</i>	8-6
8 4 1	Privately Operated Weight Bridge Management System	8-6
8 4 2	Privately Operated Transportation Center	8-8
8 4 3	Privately Operated Road Safety Initiative	8-10
8 4 4	Private Sector Initiative in Road Management Systems	8-13
8 5	<i>Additional Interventions Considered</i>	8-15
8 5 1	Privately Operated Model Road Maintenance Equipment Center	8-15
8 5 2	Capacity Building for Road Boards and Road Funds	8-15
8 5 3	Toll Road Development and Concessioneing of Roads	8-15

ANNEXES

Annex A	Scope of Work and Workplan
Annex B	SATCC Transport Protocols
Annex C	SATCC Regional Vehicle Overload Fines
Annex D	Regional Road Management Information Systems Data Formats
Annex E	List of Contacts
Annex F	Bibliography
Annex G	Tables

EXECUTIVE SUMMARY

Background

Market integration and increased trade and investment are the cornerstones for economic growth and development in the Southern Africa Development Community (SADC). Cognizant of this, SADC has undertaken to remove the remaining policy and institutional impediments to full market integration across all sectors of the region's economy.

Although SADC has made great strides towards achieving an appropriate policy framework with the adoption of the Transport Protocols, the question of whether corresponding results were obtained in the institutional structures, legal and regulatory reforms for highway management requires examination. Recent studies indicate that portions of the region's paved main road network are in relatively good condition, but that there are wide variations in road surface conditions between individual countries. Additionally, the region lacks the capacity to (1) systematically collect and analyze road network information, (2) prioritize road maintenance requirements, and (3) sustain existing highway management systems.

The premature deterioration of southern Africa's road network and the inability of the region's highway administrations to keep pace with road maintenance requirements have reached alarming proportions. Currently, there is a tremendous maintenance backlog in the southern Africa region. Some estimates place deferred maintenance costs at US\$13 billion against a road asset base valued at US\$72 billion.

The continuing vicious cycle of road surface deterioration, insufficient road maintenance and inadequate highway management persists. Thus, USAID commissioned a study of the Regional Highway Management Systems (RHMS) to identify new interventions to assist in improving regional highway management.

Study Objectives and Methodology

The principal objective of the Regional Highway Management Systems Study, as set forth by USAID/RCSA in the Scope of Work, is to inform decision-making on the best means of assisting SADC member states to establish an RHMS that leads to

- preservation of the Regional Trunk Road Network (RTRN),
- improved maintenance standards and practices and overall improvement of the RTRN,
- reduced road maintenance costs,
- improved systems of cost recovery,
- improved overall coordination in the management of the RTRN,
- facilitating the smooth flow of goods, services and people in the region, and
- increased private sector involvement in the provision and management of road infrastructure.

In order to accomplish the study's objective and address the issues indicated above, the Scope of Work and Work Plan identified the following tasks:

- Assess the current institutional structures in roads and propose ways in which they can be strengthened to function efficiently and respond to regional needs,

- Review and propose ways in which legislation can be harmonized across the region to support the new institutional structures and also facilitate creation of an enabling environment conducive to the participation of the private sector in infrastructure provision and management,
- Review existing and proposed cost recovery systems, including road user charges, the creation of dedicated road funds and propose measures to introduce an efficient, equitable charging system that will lead to more effective resource mobilization, utilization and enhanced transparency,
- Review existing overload control systems and procedures and indicate ways in which a more comprehensive and effective regional system with possible private sector participation can be introduced, and
- Address the issue of rail-road competition with respect to its relevance to the development of a regional road management system

In consideration of these tasks, the Consultant team identified and investigated the following key research issues related to highway management in southern Africa

- transition to alternative highway management structures,
- adoption of legislative and regulatory reforms,
- implementation of new highway management systems,
- road pricing policy and cost recovery systems,
- heavy vehicles weight management systems, and
- private sector involvement in highway management

A Consultant team of transport experts was mobilized to (1) conduct interviews with relevant highway agencies, institutions, companies and experts, (2) review published reports and studies, and (3) conduct field studies in the southern Africa region. Field studies were carried out in Botswana, Malawi, Mozambique, South Africa, Tanzania, Zambia and Zimbabwe.

The team's analysis and recommendations were motivated by several considerations including practicality, the expressed interests of stakeholders, ability to include both private and public stakeholders in partnering arrangements, and ability to implement recommendations in the near term to improve regional highway management.

Key Issues Related to Road System Management and Highway Maintenance Management

One of the most acute problems of road management in the SADC countries is the development and implementation of road maintenance programs. The problem areas include budget availability, lack of training and technological skills, and institutional and maintenance operating inefficiency. Road rehabilitation and other road maintenance strategies must address such needs as improving institutions as well as the capacity for contracting and developing mechanisms for financing roads.

Planning for road development should include a specific component for maintenance, covering all aspects of road maintenance and management. The first priority of the maintenance plan should be protecting roads that have been rehabilitated at great costs and/or are vital sections of the network. The second priority should be maintaining other key links in the classified network.

Improved data collection and processing are essential to improve the quality of the supporting economic evaluation. As part of developing a maintenance plan, it will be vital to develop a database containing traffic growth, such vehicle statistics as types and weights and axles, and economic growth and traffic movement. This database can be used for forecasting future traffic flows. In addition, it is essential to carry out an Origin-Destination Study linked to forecasts of expected future land development.

Using *appropriate and effective standards* is an essential component of highway development. Highway standards range over a broad area covering the technical areas such as highway engineering, standards regarding maintenance and operations (i.e., enforcement of safe speed and driving), staffing, evaluation of future needs and other areas.

The presence of *overloaded trucks* causes considerable damage to highways, which results in higher operating costs and a decline in safety. The availability of efficient and accurate scales is required as part of dealing with overloading. Another issue concerns the non-uniformity of ton axle limit standards in the region. Since the axle limit standard determines pavement design, movement between countries within the region is constrained and calls for developing coordinated axle-weight standards.

Road Management Initiative

From the 1960's onwards, African countries had invested heavily in building and extending their road networks to meet development needs. However, these assets have been poorly managed and maintained despite enormous expenditures on maintenance. These poorly maintained road systems impose a heavy economic cost on stakeholders. As an impediment to competitive national economic platforms, the poor maintenance also results in a huge opportunity cost to southern African countries in terms of restricted investment, commerce and economic productivity.

To address this situation, the World Bank and the UN Economic Commission for Africa launched the Road Maintenance Initiative (RMI) in the late 1980's to early 1990's. The RMI identified the institutional framework within which roads are managed as the primary cause for poor maintenance policy and implementation. The focus of RMI was enlarged to deal with road management.

The agenda of the Road Management Initiative is based on, what RMI terms, the "commercialization" of the road sector bringing roads into the marketplace and placing them on a "fee-for-service basis". Four interdependent and mutually reinforcing RMI elements are considered vital.

<i>Ownership</i>	Achieving active support of road users
<i>Financing</i>	Establishing an adequate and stable source of funds
<i>Responsibility</i>	Establishing a clearly defined organizational framework for managing different parts of the road network and supporting and related functions
<i>Management</i>	Managing road sector institutions on the basis of sound business and organizational principles

To achieve these building blocks, the RMI recommends three important structures: Road Authority, Roads Board, and dedicated Road Fund, with various forms of user charges.

A vital part of the RMI's approach is the effective use of the private sector for undertaking road sector functions. This further introduces business methods, market-based quality and cost control, and stakeholder commitment into the roads sector. This enables the government to focus on policy, regulation, macro planning and public oversight of the sector.

Almost all countries in the SADC region have committed to the principles developed through the RMI. Some countries have proceeded further than others and implementation has been difficult for some. The basic assumptions that governed the road sector until the late 1980's have changed. The expectations of government, stakeholders, donors and lenders now largely reflect the principles of the RMI.

Lead Role of SATCC

SATCC has assumed a coordinating and advocacy role for much of the effort towards regional vision and integration of the transport sector. SATCC is working with its member countries to define and introduce common and integrative policies, standards, user charges and other features.

The 1996 SATCC Protocols on Transport, Communications and Meteorology is the leading statement of the direction to be taken by the SADC nations in terms of the structure and operation of the road sector. The Protocols are in line with the recommendations of the RMI.

Institutional Structures

All of the countries under study have restructured or are in the process of restructuring their roads sector and institutions responsible for highway management. In some countries, such as Malawi, Mozambique, Tanzania and Zambia, this has meant an almost total reorganization of the roads sector, including the adoption of a national transport policy, new legislative and regulatory frameworks, and the establishment of new institutions (i.e., road authority or agency, road board and road fund).

The review and analysis of the institutional frameworks for highway management in the countries studied revealed a number of structural problems involving the role and functions of institutions, administrative issues, policy and financial constraints, and public and private industry capacity constraints. The inability to adequately address these problems either individually or regionally has adversely affected efforts to achieve institutional sustainability and a system of better highway management.

The Road Authority (sometimes termed the Road Agency) is one of the three institutional structures advocated by the RMI. Generally, the Road Agency has overall financial and managerial autonomy for highway management. All seven countries studied have created or are in the process of considering the implementation of road authority/agency structures.

The creation of National Road Boards to manage highway operations is another key institutional reform taking place in the road sector in southern Africa. Malawi, South Africa and Zambia have established National Road Boards. Botswana, Mozambique, Tanzania and Zimbabwe are actively considering the establishment of a Road Board.

Malawi, Mozambique, South Africa, Tanzania and Zambia have established or are implementing Roads Funds, while Botswana and Zimbabwe are considering Roads Funds.

One of the most important findings of this study is the extent to which private sector stakeholders are participating and are expected to participate at all critical levels of decision-making related to highway management. The role of the private sector has changed in recent years. The private sector is increasingly involved in policy dialogue, decision-making, contracting and service provision.

Although most of the countries studied have begun the process of restructuring their road administrations to achieve more effective highway management, the exact roles, responsibilities and authority of these institutions have yet to be fully rationalized. Perhaps the foremost institutional challenge facing these countries is the adoption and implementation of legislation creating road authorities.

The main policy and financial constraints relate to cost recovery from road users. Further compounding the problem is the inability of the countries studied to finance their maintenance budget shortfall without external assistance. Procedures for allocating maintenance investment funds that vary for different classes of roads also compound the problem of better highway management. This is especially evident in the southern African countries studied, which are characterized by a lack of use or the non-existence of a fully integrated and operational highway management information system and decision-support system. Even in countries with sound pricing policies, revenue collection and remittance procedures for user charges have often frustrated the National Road Boards and Road Funds.

With the restructuring of highway management, the technical and managerial capacity of the highway authorities in some countries (e.g., Mozambique, Tanzania and Zambia) to effectively supervise the expected volume of work is doubtful. The private sector will play a more active role in engineering design services and road maintenance. By contrast, the public sector will assume more of a supervision and inspection or project management role. Consequently, the relevant highway authorities will have to either train or recruit more engineers and other technical staff. However, some countries do not appear to fully appreciate the extent of the problem.

Legal and Regulatory Framework

Corresponding to the institutional reforms taking place in highway management, several changes are occurring in the legal and regulatory frameworks that govern the road sector. These frameworks need to be reformed to create the necessary enabling environment for successful institutional changes.

Overarching all of the country-specific legislation and regulations governing the roads sector are the SADC Protocols on Transport. The Protocols are now in force. Eight countries have ratified the Protocols, and full ratification is still pending in four of the twelve original SADC member countries.

The key legislative and regulatory constraints to improving highway management involve the lack of a clear definition of the roles, functions and responsibilities of the highway institutions. The key unresolved issues concerning many road funds relate to (1) the level and type of user charges, (2) the collections and remittance procedures, and (3) the allocation procedures for different classes of roads and different geographical areas.

Although countries such as Malawi, South Africa and Zambia have the necessary legislative framework to achieve a sustainable highway management system that offers broad scope for private sector involvement, many of the countries studied do not. Legislative revisions to dedicate road user charges to a road maintenance and development fund remain problematic in most countries. Few of these countries have the necessary legislative framework to permit BOO/BOT operations in civil works, tolls road

development, concessioning of overload control systems and border posts, and/or concessioning of their highway management information systems

However, one component of SATCC's STEP/PAAS project is the creation of model legislation that will permit BOO/BOT operations within member countries. It is anticipated that the initial draft of this legislation will be presented to the SATCC Ministers of Transport in June 1998. Assuming this draft is consistent with sector requirements and the needs of the SADC countries, the implementation of this legislation will establish a harmonized, regional legislative framework for BOO/BOT operations in SADC countries.

Highway Management Systems

Budgetary constraints and accelerating road surface deterioration in the seven countries under study highlight the urgency of allocating public funds and other resources on the basis of economic efficiency. National governments have been unable to keep pace with their networks' maintenance needs, or to resolve competing demands for road funds in a socially optimal manner.

The necessary complex decision-making can only be rationally undertaken by using a highway management systems approach that relies on sound economic and technical criteria. Typically, an integrated highway management system consists of at least two main components: a highway information system and a decision support system. The highway information system collects, organizes and manages data and information. The decision-support systems include management applications to process data and allow informed decision-making about road network management.

The adoption of the RMS approach proposed by the SATCC Group of Experts on Road Infrastructure has been uneven amongst the countries studied. Only Botswana, South Africa and Zambia have the full complement of HMS system features recommended by SATCC. HMS systems in other countries, such as Mozambique, Tanzania and Zimbabwe, still lack full deployment, while Malawi does not have one. Thus, except in a few countries, the use and application of the HMS systems has not yet been an effective tool for highway management decision-making by road authorities.

SATCC/TU recognizes the need for accurate, current transport information to make informed policy and infrastructure decisions. Presently, SATCC is updated on the state of road transport in the region every six months. This process is too slow, often has incompatible formats, and does not provide timely information. SATCC/TU proposes the establishment of a Regional Road Management Information System (RRMIS).

The RRMIS system is proposed as a real-time interactive network linking each member country to a central server. Each country will be able to upload their highway data, and download summary tables and analytical reports of its own data, and summary comparison tables and analytical reports of other countries. SATCC/TU will be able to analyze country data uploaded on the network and provide member countries with analytical reports. The Canadian International Development Agency (CIDA) is expected to finance the development of the RRMIS at a cost of C\$11.0 million. Should USAID/RCSA desire to assist the SADC region to develop a Regional Highway Management System, opportunities are more likely to be available at the country-specific level rather than regionally.

Although efforts are underway to improve the region's highway management systems, particularly as they relate to highway management information systems, the definitions and standards for such MIS systems

lack compatibility and transferability. They are often confusing, contradictory and lacking in consistency and compatibility. This provides an opportunity for USAID to support the development of the RRMIS by funding complementary interventions. Therefore, it is recommended that USAID fund the development of an Internet-Resident Roads Definition and Standards Manual (IRDS).

Heavy Vehicles Weight Management Systems

One of the causes of premature deterioration of the region's highways is repetitive heavy vehicle overloading and increased traffic. The most serious contributor to this premature failure of pavements and running surfaces is the overloaded truck. The incidence of vehicle overloading in southern Africa has reached alarming proportions.

There are wide disparities amongst countries in the region with respect to vehicle axle-load and Gross Vehicle Mass (GVM) standards, despite long-standing attempts to harmonize standards by regional institutions such as COMESA and SATCC. Such disparities do not appear to be justified and may contribute to overloading.

Axle-weight control and enforcement is carried out by myriad of agencies and officials in the southern Africa region. Consequently, the number of agencies and officials involved complicate a regional approach. However, the most serious problem road authorities face are weak managerial capacity, and the lack of trained officials to effectively manage, operate and maintain the weigh bridges.

The sanctions and penalties imposed on offenders are inadequate to effectively deter vehicle overloading. Moreover, existing control measures involving specific sanctions and penalties are so varied that they render a regional approach impractical in the absence of a more rationalized system.

Recently, both COMESA and SATCC have intensified efforts to address the problem of vehicle overloading. In late 1997, COMESA ministers agreed to harmonize institutional policies and measures for regional Vehicle Weight Management. The Council of Ministers directed that heavy vehicle weight management systems be effected after member states introduce a fees-based system on a sliding scale. It also agreed on other conditions, penalties and means to exchange information.

The approach that would provide greatest cost-effectiveness and time savings is joint management and operations of weighbridges by countries sharing a common border.

The SATCC Workshop on Overload Control identified several actions to control vehicle overloading including (1) improve supervision at the weighbridges, (2) provide incentives for weigh bridge staff, (3) revise legislation to change fines to fees, (4) improve road network monitoring, (5) maintain existing weigh bridge equipment, (6) improve training for enforcement officers, and (7) improve weighbridge operations.

Repeated calls by regional institutions such as COMESA and SATCC to enact a harmonized system of laws and regulations for controlling overloading have not, on the whole, been successful – primarily, it appears, because of lack of political will on the part of national governments.

Although these are important steps to control overloading, the likely success and effectiveness of these measures are uncertain. The role of private stakeholders has not yet been effectively enunciated. The focus needs to be shifted from a government enterprise lacking in incentives to control overloading to private involvement where a proper balance is achieved between incentives and disincentives. COMESA

suggested the need for a self-regulating system that places the onus for controlling overloading on transport operators and freight forwarders. Virtually every country currently reports that most road transport operators view overloading as a rational and cost-effective business behavior.

A model project in heavy vehicle weight management would appear to be an excellent and timely investment for USAID. With many of the countries having recently passed or considering passage of new legislation for establishment of vehicle weight management programs, wide scope exists to assist these countries to implement the new legislation. Strong consideration could be given to implementing such an activity on a corridor basis involving two or more countries, such as between Malawi, Tanzania and Zambia or Malawi, Mozambique and Zimbabwe.

Cost Recovery Systems

Transport economists generally believe the costs of pavement damage should be accounted for when pricing road use. Such costs typically represent (1) road maintenance costs incurred by the road administration responsible for maintaining the road, and (2) road user costs, or, those costs incurred by vehicle operators who use the road.

One of the most important conclusions of the World Bank's RMI is that there is no clear price for roads. Road expenditures are usually financed from general tax revenues and the road agency is not subject to any rigorous market discipline.

Of all the charging instruments in use in the seven countries under study, the one most widely applied is the fuel levy. Beyond licenses and transit fees, few countries apply other instruments to generate revenue to finance road maintenance. The lack of a heavy vehicle license fee is revealing, especially in light of the fact that heavy vehicles cause the most pavement damage. Only Zimbabwe currently imposes a heavy license vehicle fee.

Regional institutions, such as SATCC and COMESA, have taken the lead in advocating a clear road pricing policy based on sound economic principles and a standard methodology and procedures for estimating charges for road use. In 1992, the PTA (COMESA's predecessor) and SATCC commissioned a joint study that was to form the basis for a harmonized road pricing policy and a standard methodology for estimating the cost of road use and the corresponding road pavement damage. The PTA's approach to setting cost recovery prices was recommended.

Member countries are considering adopting the findings and recommendations of the joint SATCC-PTA study. However, no agreement among member states has been reached to adopt the PTA's road pricing policy and methodology. Currently, the road pricing policies in most of the studied countries often remain unrelated to road pavement damage costs or road use cost.

The issue of which agency should collect the user charges remains problematic. None of the Road Funds studied collect their own revenues. In the case of Tanzania and Mozambique, this procedure presents cash flow problems for Road Funds because the Ministry of Finance often retains the funds in its own accounts longer than anticipated.

Several regional and other institutions have been active in promoting appropriate road financing and taxation policies for road maintenance in southern Africa. In view of this, and of the ongoing joint efforts by COMESA and SATCC to harmonize road pricing policies and adopt a standard methodology for

estimating pavement damage cost, it is recommended that USAID not seek any involvement in this area at this time

The collection of fees from road users, however, is an ideal way to involve the private sector, particularly collection of transit fees, weigh bridge fees, overload infraction fines, bridge and toll fees. Such collections are ideal functions for the Model Transportation Center and Border Post or the Model Heavy Vehicle Management Center as recommended by this Study

Inter-Modal Competition

Inter-modal competition, such as between road and rail, is primarily an issue of pricing transport services and allocation of resources. The question of government's preferential treatment of one mode over the other is a frequent topic of debate. Despite the railways' monopoly position or the direct investments in the road sector, it is not clear that national governments favor one mode over another. Inter-modal competition and transport market share, in many cases, tend to be more a question of user preference based on service quality and reliability rather than government intervention in transport markets.

Countries such as Botswana, Malawi, Mozambique, South Africa, Tanzania, Zambia and Zimbabwe are taking steps to liberalize their transport sectors to permit more efficient functioning of the transport markets through market-based price signals. The broad question of road-rail competition was not an issue in any of the discussions with public or private stakeholders in the seven countries studied. Consequently, road-rail competition is not regarded as a priority issue to be addressed in improving highway management for southern Africa.

Recommended Actions to Improve Regional Highway Management

Four specific interventions are proposed. These recommendations, when implemented, will significantly improve the movement of goods throughout southern Africa. They received broad support in virtually every country under study. While most of these topics have been identified previously and discussed in various regional public and private fora, what is presented here are new and innovative approaches to achieve successful outcomes in highway management.

In developing the recommendations set forth in this report a number of factors were considered

- Stakeholders ownership,
- Scope for implementation by the private sector,
- A partnering approach involving both public and private interests,
- Potential impact on regional market integration
- Reduction of regional transportation barriers
- Potential regional economic benefits
- Impact on preserving the regional trunk road network,
- Formulation of an innovative approach to achieve successful project outcomes, and
- Interventions that complement existing or proposed highway management initiatives

Recommendation Privately Operated Weighbridge Management Systems
(Model Heavy Vehicle Weight Management System Estimated Costs US\$3-4 million)

This recommendation is for USAID to issue a Request for Proposal (RFP) for a Model Heavy Vehicle Weight Management System (MHVWMS) The MHVWMS should be privately designed, built, managed and operated as a demonstration project The MHVWMS project is to be implemented in two or more countries with common borders to achieve scale economies and efficiencies

Public officials and private stakeholders in each of the countries under study expressed their interest in and commitment to an effort of this type The potential for high investment returns are evident

Recommendation - Privately Operated Transportation Center
(Model Transportation Center and Border Post (s), Estimated Costs US\$2 5-3 0 million)

This recommendation is for USAID to issue an RFP to Build Own Operate (BOO)/Build Operate Transfer (BOT) a Model Transportation Center and Border Post for two or more common Border States The concept envisions a Center, preferably at the border of two countries, or potentially at a Port of Entry Located between two countries, such a Center would eliminate the current "one on each side" approach The Center would be constructed and initially operated on a design, build, operate and transfer approach It would be automated with modern communications and computer equipment to service user needs and provide real-time information to relevant authorities The Center could provide axle-weight inspections and customs-related services Finally, the Center could also serve as a "one-stop payment point" or coupon collection for transit fees required in the transit or destination country

Recommendation Privately Operated Road Safety Initiative
(Model Road Safety Initiative, Estimated cost US\$3 million)

While most SADC countries have initiated road safety programs, few, if any, actual resources are being expended to reduce accidents and improve road safety The prospective road safety program should include the following (1) identification of high incidence accident sites and proposal to mitigate, (2) development of a hard hitting road safety campaign, (3) proposal and action for getting dangerous vehicles off the road, (4) campaign to identify and remove inebriated drivers, (5) development of accurate statistical base of accidents, injuries and fatalities, and (6) proposal for community involvement in accident reduction

USAID would provide support for a privately operated Model Road Safety Initiative This would consist of a safety audit on a corridor or national high traffic volume route or routes, a safety campaign, and a three-year recording of safety/accident statistics While it may be difficult to design a profitable private sector effort in this area, it should be fairly easy to demonstrate that a well run, privately operated, safety program can significantly reduce road accidents

The RFP would invite offerers, under a joint public-private arrangement, to initiate a Road Safety Initiative (RSI) The RSI could be initiated either in a transport corridor or on high traffic route or routes To achieve success, countries in partnership with private sector firms, groups or associations must have ownership of the RSI

Recommendation Private Sector Initiative in Road Management Systems
(Internet-Resident Road Definitions and Standards Manual, Estimated Cost US\$2 million)

This recommendation is for USAID to assist in the development of regional highway definitions, standards and specifications sufficient to develop a database that could provide the minimum level of data required to manage and maintain the regional network. It is recommended that USAID work in collaboration with SATCC/TU and COMESA to develop an Internet-Resident Definitions and Standards Manual for southern Africa. Such an initiative would appropriately address regional road management standards on the regional trunk road network in southern Africa and would complement other RMS systems now being proposed.

The RFP would invite offerers to develop an Internet-Resident Road Definitions and Standards (IRDS) manual for access and use by all SADC member countries.

Additional Interventions Considered

In addition to the four interventions recommended above, a number of other interventions were considered. Noteworthy options included (1) assistance for a privately-operated model road maintenance equipment center, (2) institutional capacity building involving training and technical assistance to Road Boards and Road Funds, and (3) toll road development and concessioning of roads.

CHAPTER 1: INTRODUCTION

1 1 Background

Market integration and increased intra- and inter-regional trade and investments are the cornerstones for economic growth and development in the Southern Africa Development Community (SADC)¹ Cognizant of this, SADC has undertaken to remove the remaining policy and institutional impediments to full market integration across all sectors of the region's economy In the transport sector, which is the subject of this study, SADC in 1996 adopted a specific set of Transport Protocols with the objective of

“establishing transport systems which provide efficient, cost-effective and fully integrated infrastructure and operations, which best meet the needs of customers and promote economic and social development while being environmentally and economically sustainable”²

On a modal basis, the objective of the Protocols for the roads sector is to

“ensure and sustain the development of an adequate road network in support of regional socio-economic growth by providing, maintaining, and improving all roads including primary, secondary and tertiary and urban roads, including those segments which collectively constitute the Regional Trunk Roads Network”³

Although SADC has made great strides towards achieving an appropriate policy framework with the adoption of the Transport Protocols, the question of whether corresponding results were obtained in the institutional structures, legal and regulatory reforms for highway management requires examination It is against this policy framework and background that this study has been conducted

1 1 1 Overview of the Road Sector in SADC

The total road network of the SADC region consists of some 860,760 kilometers (km) Of this amount, about 12 percent (100,477 km) are paved main roads, 26 percent (222,450 km) are unpaved main roads and 62 percent (537,833 km) consists of rural roads The Regional Trunk Road Network (RTRN) accounts for 45,466 km or about 5 percent of the total road network

¹ The Southern Africa Development Community (SADC) includes the fourteen countries of Angola Botswana, Democratic Republic of Congo Lesotho, Malawi Mauritius Mozambique Namibia, Seychelles South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe In 1980 Angola, Botswana, Lesotho Malawi Mozambique Swaziland, Tanzania and Zambia established the Southern African Development Coordination Conference to establish regional cooperation SADC evolved from this Conference and was formally established as a regional community in 1992

² SADC Protocols on Transport, Communications and Meteorology, 1996

³ For a fuller description of the SADC Protocols governing road transport, see Annex B

More than half (51.2 percent) of the region's total road network and about 57 percent of the paved main roads are located in South Africa. Compared to the region as a whole, South Africa is less dominant when the RTRN is considered. South Africa accounts for only 14.5 percent (6,572 km) of the RTRN.

Recent studies indicate that the paved main road network is in relatively good condition⁴. However, wide variations in road surface conditions exist between individual countries. For example, some 90 percent of the paved roads in Namibia and more than 70 percent of roads in Botswana and Lesotho are in good condition. In contrast, roads in Angola and Mozambique are generally in poor condition. Additionally, the region lacks the capacity to (1) systematically collect and analyse road network information (e.g. surface conditions, traffic levels, etc), (2) prioritize road maintenance requirements, and (3) sustain existing highway management systems.

1.1.2 Road Surface Deterioration and Economic Impacts

The premature deterioration of southern Africa's road network and the inability of the region's highway administrations to keep pace with road maintenance requirements has reached alarming proportions. This situation is attributable to several interrelated factors. These factors, *inter alia*, are the result of (1) institutional, (2) budgetary, (3) managerial and technical capacity, (4) legal and regulatory, and (5) other constraints to improved highway management.

Often overlooked in the discussion of inadequate highway management are the economic consequences of the lack of road maintenance. Roads in poor condition increase vehicle operating costs and thus increase the cost of transport to road users. Increased transport costs add to the cost of production and consumption and place downward pressure on regional trade and investments. Compounding this problem is the added cost of road maintenance, as repetitive axle loads of heavy vehicles cause further deterioration to the road network. The result is a spiralling downward effect, whereby deteriorating road surfaces because of inadequate maintenance experience further deterioration due to vehicle overloading. Conversely, road use costs and maintenance costs are spiralling upwards.

Currently, there is a tremendous maintenance backlog in the southern Africa region. Some estimates place deferred maintenance costs at US\$13 billion against a road asset base valued at US\$72 billion. Annual road maintenance is estimated to cost some US\$1.75 billion per year over the next six years. Currently the SADC member states fund only about 60 percent of their overall maintenance requirements.

The precarious situation of the region's highway administrations and the pernicious nature and economic consequences of inadequate road maintenance have prompted multilateral finance institutions (such as the World Bank, African Development Bank, USAID, CIDA) and regional institutions (such as the Common Market for Eastern and Southern Africa (COMESA) and the Southern African Transport and Communications Commission (SATCC)) to work with the countries in the region to consider new

⁴ The World Bank's definitions of road surface conditions are (a) Good - a paved road in good condition is substantially free of defects and requiring only routine maintenance. An unpaved road in good condition needs only routine maintenance, (b) Fair - a paved road having significant defects and requiring resurfacing or strengthening. An unpaved road in fair condition needs reshaping or resurfacing and spot repair of drainage, (c) Poor - a paved road with extensive defects and requiring immediate rehabilitation or reconstruction. An unpaved road in poor condition needs reconstruction and major drainage works. See World Bank (1987) "Road Deterioration and Maintenance Effects" Highway Design and Maintenance Standards Series, prepared by W D O Patterson. Washington, DC.

approaches to these problems. Currently, the World Bank and SATCC are advocating new institutional legal and regulatory reforms to improve highway management. For example, the PTA, COMESA's predecessor, proposed road pricing policies and cost recovery systems to address highway financing and investment issues. In 1994, USAID launched two major transport initiatives: (1) a technical assistance project to provide policy analysis and capacity development support to SATCC under the SADC Transport Efficiency Project (STEP), and (2) funding to SATCC to develop the SADC Transport Protocols.

Notwithstanding the result of these efforts, the vicious cycle of road surface deterioration, inadequate road maintenance, and highway management capacity constraints persists. Thus, USAID commissioned the study of the Regional Highway Management Systems (RHMS) to identify new interventions to assist in improving regional highway management.

1.2 Objectives of the Study

The principal objective of the Regional Highway Management Systems Study, as set forth by USAID/RCSA in the Scope of Work, is to inform decision-making on the best means of assisting SADC member states to establish a RHMS that leads to

- preservation of the Regional Trunk Road Network (RTRN),
- improved maintenance standards and practices and overall improvement of the RTRN,
- reduced road maintenance costs,
- improved systems of cost recovery,
- improved overall coordination in the management of the RTRN,
- facilitating the smooth flow of goods, services and people in the region, and
- increased private sector involvement in the provision and management of road infrastructure.

1.3 Task Description

In order to accomplish the study's objective and address the issues indicated above, the Scope of Work and subsequent work plan identified the following five tasks:

1. Assess the current institutional structures in roads and propose ways in which they can be strengthened to function efficiently and respond to regional needs,
2. Review and propose ways in which legislation can be harmonized across the region to support the new institutional structures and also facilitate creation of an enabling environment conducive to the participation of the private sector in infrastructure provision and management,
3. Review existing and proposed cost recovery systems, including road user charges, the setting up of dedicated road funds and propose measures to introduce an efficient, equitable charging system that will lead to more effective resource mobilization and utilization and enhanced transparency,

- 4 Review existing overload control systems and procedures and indicate ways in which a more comprehensive and effective regional system with possible private sector participation can be introduced, and
- 5 Address the issue of rail-road competition and its relevance to the development of a regional road management system

1 4 Key Research Issues Investigated

In consideration of the above tasks, the Consultant team identified and investigated a number of key research issues related to highway management in southern Africa. The main issues investigated in this study include the following

- transition to alternative highway management structures,
- adoption of legislative and regulatory reforms,
- implementation of new highway management systems,
- road pricing policy and cost recovery systems,
- heavy vehicle weight management systems, and
- private sector involvement in highway management

1 5 Research Methodology

A six-person Consultant team of transport experts were mobilized to (1) conduct interviews with relevant highway agencies, institutions, companies and experts, (2) review published reports and studies, and (3) conduct field studies in the southern Africa region. Field studies were undertaken in Botswana, Malawi, Mozambique, South Africa, Tanzania, Zambia and Zimbabwe. The Consultant team consisted of the following specialists

- Senior Transport Economist and Team Leader,
- Regional Highway Engineer,
- Highway Management Specialist,
- Senior Planner and Policy,
- Information System Expert, and
- Institutional Specialist

The Consultant team was divided into two groups: a field studies team and a research and support team. The field studies team conducted visits to the selected countries. The research team conducted interviews with transport agencies and institutions in Washington. This group also researched and reviewed published reports and studies on highway management systems, including highway information systems, decision-support systems, road pricing policies, cost recovery systems, vehicle overload control systems and institutional structures for highway management.

The technical approach was to systematically analyse the highway administrations in each of the seven selected countries in a variety of specialized research areas. This involved, *inter alia* (1) review of the roles, functions and responsibilities for highway management of each administration, (2) identification of all institutions responsible for highway management activities including funding, policy formulation, planning, budgeting and programming, and maintenance operations, (3) review of the legal and regulatory framework governing highway institutions, (4) review of the cost recovery systems and charging instruments used, (5) review of vehicle overload control systems, and (6) review of the highway information and decision-support systems.

The research methodology employed to conduct this study involved a multi-step process. It included

- Reviewing published technical studies and reports on all aspects of highway management (see Annex F for a complete Bibliography),
- Client consultations on tasks to be performed and finalization of target countries,
- Preparing a detailed work plan for study execution,
- Preparing a study guide that lists interview questions for each area of research focus,
- Interviewing key private and public stakeholders (e.g. road transport operators, shippers and receivers, freight forwarders, government officials responsible for various highway activities, and consultants),
- Preparing individual country trip reports that address initial findings, key issues, and identification of prospective interventions,
- Collating information collected in the field and conducting analysis of the information,
- Formulating a list of recommendations for short-term implementation efforts,
- Preparing the draft report and findings, conclusions and recommendations, and
- Preparing and delivering the final report.

The team's analysis and recommendations provide suggestions that are practical, reflect stakeholders expressed interests can be implemented by private and public stakeholders in a partnering arrangement, and can be undertaken in the near-term to improve regional highway management. Given this perspective and the fact that the list of recommendations are relatively short, it was not necessary to prioritize the recommendations.

1.5.1 Field Studies

The study team conducted the field interviews in two stages. The first phase of interviews occurred over a two and half week period beginning on March 6th and ending March 19th. The second phase began on April 27th and ended on April 30th. Countries visited included Botswana, Malawi, Mozambique, South Africa, Tanzania, Zambia and Zimbabwe. A complete list of interview contacts is presented in Annex E.

1 6 Organization of the Report

The remainder of this report consists of seven chapters. Chapter 2 discusses the basic principles and issues covered by the study, and the regional context of the road transport sector. Chapter 3 discusses alternative institutional structures for highway management. It contains a discussion of the road agency, the road board and the road fund. Chapter 4 presents the legislative and regulatory framework governing highway management activities. Chapter 5 discusses highway management systems, including a discussion of the application and use of highway information systems and decision-support systems. Chapter 6 examines heavy vehicles weight management systems including axle limits, incidence of overloading, enforcement and sanctions. Chapter 7 reviews road pricing and cost recovery systems, and examines charging instruments and estimating procedures for cost recovery. Finally, Chapter 8 presents recommendations to improve regional highway management in southern Africa.

CHAPTER 2

KEY PRINCIPLES AND ISSUES CONCERNING ROAD MANAGEMENT IN THE SADC REGION

2.1 Introduction

The purpose of this chapter is to introduce and describe the key issues concerning road sector management in the SADC region, and to discuss principles and actions that are important in improving road management. Detailed country analyses are presented by topic in subsequent chapters.

Efficient and effective management and development of highways requires a wide range of tools, techniques and skills. This is especially true where a regional network is involved. There are significant issues and principles that must be considered and implemented as key factors for a successful road management program.

Road management program objectives are to develop an efficient and effective network, and to provide mobility to individuals, goods and services. This is essential for economic development and growth. Road financing and maintenance are the two main issues of road management. Other key areas include appropriate road designs by highway engineers, the ability to undertake cost-benefit analysis evaluating the cost of highway investment versus its contribution to economic growth, and development of effective organizations and transport institutions.

2.2 Key Issues Related to Road System Management and Highway Maintenance Management

A major task of highway management is to ensure that roads are properly maintained. Road maintenance is an essential input designed to ensure that roads provide an appropriate level of service characterized by smooth driving conditions for all the vehicle types using the facility. Road investments are justified as the improvements in road surface and safety generate increased mobility and economic growth.

Despite these benefits, the development and implementation of road maintenance programs represents one of the most acute problems of road management. The problems associated with road maintenance are found worldwide, however, the difficulties and problems are more extensive in the developing countries. The problem areas include budget availability, lack of training and technological skills, and institutional and maintenance operating inefficiency. All of the SADC countries face these challenges.

2.2.1 Current Conditions

Many of the SADC countries have neglected their road networks, resulting in poor and in some cases impassable roads. A capable and efficient road network is essential for the economic development and growth of the region and its member countries. Lack of a good highway means a lack of mobility, not only to support economic growth but also for the range of basic and essential social needs. Therefore, it is essential for each of the SADC countries to develop a consistent Maintenance Management Plan. Given the economic growth benefits that are associated with a cooperative regional effort, a coordinated regional plan should also be developed.

A 1997 report noted that funding for maintenance in the region was inadequate and is a serious problem¹. Further confirmation of the road maintenance difficulty is illustrated by the problem areas identified by the SADC Study: low government priority for road maintenance, insufficient and fluctuating funding for roads, and inadequate and unsatisfactory management of roads and cost control. The importance of maintenance is clearly identified, and it should be noted that the other two problem areas are directly linked to maintenance and will have to be considered in developing network maintenance plans.

The road conditions are well described in the SADC Report and confirm the scope of the maintenance problem. Paved roads account for a small share of the standard road networks in the region. For example, only 20 percent of the road networks in Mozambique and Botswana are paved, the rest is gravel or earth.

A good many of the SADC countries have a large percentage of earth roads: Botswana (60 percent), Mozambique (42 percent), Tanzania (86 percent), Swaziland (42 percent), Zambia (87 percent) and Zimbabwe (51 percent). This indicates the likely need to develop an expanded maintenance program. This is further stressed by the very poor road conditions reported by the SADC Study. Particularly, poor road conditions are common in Mozambique, Tanzania, Zambia and other countries. Consequently, the urgency for road maintenance and improvement is evident.

2.2.2 Primary Areas For Improvement

Where road maintenance has been neglected and road conditions have deteriorated, it is likely that the networks will deteriorate. This degeneration will disrupt goods and passenger transport which, in turn, generates significant increases in the cost of transportation. The increased transportation costs result in loss of goods and passenger mobility and access to market, as well as deterioration of the region's position in international trade where road transportation to ports is critical. These problems are even more serious where access to ports and other key locations require passage through urban areas where maintenance is also neglected.

In the context of this Regional Study where road rehabilitation and other road maintenance strategies are required, it is essential to improve institutions, the capacity for contracting and developing the mechanisms for financing roads, and other critical requirements for maintenance.

In general, maintenance should be transferred, where financially justified, from force account works to private contractors. Measures to increase road user charges and finance road sector planning are also needed. In many cases, a Road Fund may be an effective strategy not only for road maintenance but also for managing revenue sources such as road user charges, public budget road shares and other potential sources. Ghana and other countries provide excellent examples of a road fund's contribution to road development and maintenance.

Planning for road development should also include a specific component for maintenance, covering all aspects of road maintenance and management. The following attributes and elements should be included in the plan.

¹P. Mainwaring, SADC Road Network Management and Finance Volume II

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- (1) Development of a prioritized countrywide (or regional) four- or five-year Road Maintenance Program Plan organized on the basis of using a three priority approach
 - a First priority is the need to protect those sections of the network which have been rehabilitated at great costs and/or are vital sections of the network
 - b Second priority should be allotted to other key links in the classified network
 - c All other classified roads should be assigned to the third priority level, and all of the priority levels should be linked to Average Daily Traffic Levels (ADT)
 - (2) Improved data collection and processing are essential to improve economic evaluation, applied to periodically confirm and review the prevailing priorities (measured in economic terms) and phasing of road maintenance activities. In addition, the economic evaluation will provide guidance in terms of evaluating the road types (i.e., paved, gravel) and maintenance cost categories (i.e., periodic, mechanized routine, manual routine),
 - (3) As part of developing a maintenance plan, it will be vital to develop a data base containing traffic growth (in ADT), vehicle types, and weights and axles along with economic growth and traffic movement. This database will provide information for forecasting traffic. The forecasts must include types of vehicles and their axle loads in order to determine the type of road surface that should be used and can be economically justified. The latter factors are also required so that a consistently phased and justified budget maintenance plan can be prepared.

In addition, it is essential to carry out an Origin-Destination (O-D) Study linked to forecasts of expected future land development in order to be able to estimate the type of new roads and their probable location. The O-D Study not only has an impact on new roads but also the range of maintenance options that have to be evaluated.

2.2.3 Maintenance Improvement Strategies

In terms of planning maintenance, there are a number of attributes and corrective strategies that should be taken into account.

- 1 **Lack of Visibility** Road maintenance does not generate the excitement associated with other major public capital projects, and is often not politically compelling. In developing the plan, steps need to be taken to keep the public aware of the importance of maintenance and its key role in economic development and growth.
- 2 **Lags in Applying New Ideas and Technologies** Training in road maintenance tends to lag behind technical advances, it is essential to update the technical capabilities of concerned staff through training programs--both to those already working and those studying civil engineering and/or road design and construction.

- 3 **Lack of a Pavement Maintenance Management Systems (PMMS)** PMMS systems enable managers to access an inventory of consistent and comprehensive data on pavement conditions, including condition rating and maintenance and repair requirements
- 4 **Expand and Emphasize Maintenance** As part of the budgeting for highway capital investment, establish set-asides and develop requirements that encourage a greater commitment to maintenance

2.2.4 Standards

The development of appropriate standards is an essential factor in assuring that roads are developed using appropriate and effective guidelines. Highway standards cover technical areas such as highway engineering, maintenance and operations (i.e., enforcement of safe speed and driving, staffing evaluation of future needs and other areas)

The development of an appropriate highway requires that standards be set regarding the nature of the road that will be needed. This includes the engineering factors such as the number of lanes, the nature of the alignment, the type of surface based on the vehicle weights that will be using the highway section involved, and the scope and requirements in terms of enhancing the regional network. It is important that all the standards are interrelated and must, therefore, be coordinated.

Areas for which standards are important include, amongst others

- 1 **The scope and standards to be used in order to carry out the required forecasts for specifying the road requirements** The forecast will have to project traffic volumes (for a period of about 10 years), prepare an Origin-Destination study in order to determine the origin of vehicles to access the number of lanes that will be needed, and determine the distribution of the vehicle fleet that will be operating on the highway, especially trucks measured in terms of axle loadings
- 2 **Specification of the standards related to the surfacing materials** The surfacing and materials needed to handle heavy vehicles in order to minimize their damage to the surface need to be specified. These standards are vital in terms of controlling /minimizing maintenance and providing a good surface. Damaged surfaces slow down vehicles, usually increase vehicle operating costs and typically increase the accident rate
- 3 **Make use of the advantages of technological advances** associated with highway management and maintenance. Pavement technology has changed and advanced substantially, and it is important that these advances be examined and incorporated into its use where appropriate. In addition, standards regarding the frequency and scope of maintenance will also have to be related to the changes in technology and upgraded if the present standard is inadequate
- 4 **Develop a standard for when to pave a gravel road** One of the areas that requires a reasonable standard is the decision to surface a gravel road. Very often, gravel roads are prematurely surfaced, resulting in higher costs than are justified. Where rural roads are involved, this decision becomes even more important

- 5 **Standardize Costing Procedures** Costing related to highway maintenance, road rehabilitation and construction should be established together with their respective frequency in order to develop consistency between the costs and to create realistic cost assumptions. In addition, unit costs should be developed for both force account and contract work.
- 6 **Set Standards for Economic Evaluation of Investment** The economic evaluation of a proposed maintenance program calls for a comparison of the incremental benefits generated by the incremental costs associated with the proposed program. The methodology for undertaking the economic evaluation of a maintenance investment is well defined and is readily available. For instance, the World Bank has developed a computerized program for the economic analysis as well as other attributes related to road maintenance management. The program is called the Highway Development Maintenance (HDM) Program. The latest version is HDM3, and an improved version, HDM4, will soon be available.
- 7 **Standardized Road Classification** is an important component of all the various issues and principals and procedures described above. It should be made consistent and effective in terms of the standardization features described above covering management and maintenance. In addition, the classification definitions of each of the countries covered by this study should be coordinated. A unified regional system would provide economies of scale along with consistency in the roads and thereby a more effective regional network.
- 8 **Standards Regarding Staff** It is apparent from the examples describing the importance of developing standards for road system management and maintenance that qualified staff is essential. In view of the range of skilled staff required for all aspects of road management and maintenance, construction, financing and other areas, it is essential to set up standards for each skill area in order to assure that staff will have the appropriate skills required to run the systems efficiently.

2.2.5 Overload Control/Traffic Management

As noted, the presence of overloaded trucks may cause considerable damage to the highway which, in turn, will result in higher operating costs for trucks, autos and other vehicles as well as a decline in safety and the associated increase in accidents. The poor condition of the roads in the SADC area confirms the damage from overloaded truck traffic and demonstrates the need to control and prevent overloading. It should also be noted that because of overloading and its damage, a greater amount of and more frequent maintenance is needed. The specific impact of overloading on pavement is primarily based on the axle loadings and is much more significant than total weight.

An essential requirement in addressing the overloading issue is the availability of efficient and accurate scales. In addition, it is necessary to have the scales distributed so that they are operating at the key heavy truck traffic locations.

Another issue stems from the fact that the ton axle limit standards between the SADC countries are not uniform. Since the axle limit standard determines the pavement design, the movement between countries within the region is constrained and calls for developing coordinated axle-weight standards.

Another approach for dealing with the overloaded trucks is the use of enforcement for not only weighing in but also sampling of vehicles that appear overloaded using mobile or stable scales, which are likely to be more reliable than weigh in motion. There are other enforcement approaches based on the amount of overload. It is possible to determine the scope and cost of road damage caused by the excess load, and a penalty could be based on this incremental cost. Another penalty used in many countries throughout the world is to require that the overloaded tonnage be unloaded.

As noted, penalties should be applied using the cost of the damage as the basis for the penalty to be paid. In some countries after a specified number of offenses, the offender is not allowed to use his truck on specified roads of the network, and if the offender is caught again, he is prohibited to operate any commercial activity by his truck. There are many variations that are used, and one approach is to try and build the road so it can handle the axle weights anticipated to be operating. This may call for somewhat higher costs for the pavement but compared with pavement costs generated by the overloads, it is likely to result in net saving due to the difference between truck damage and the cost of upgrading the road.

2.2.6 Legal and Regulatory Requirements

Parallel to the institutional reforms that are occurring in highway management in southern Africa is a significant change in the legal and regulatory structure of the highway sector. This change was required in order to be able to implement the much-needed institutional changes necessary for improved highway management. Since most of the legal and regulatory structures were formulated in the colonial era, these structures and the institutional arrangements needed to be modernized to effectively respond to the current conditions.

Even within the time frame in which the above changes took place, there are new changes needed in the legal and regulatory conditions. For example, throughout the world, there has been a rapidly growing trend to use the private sector for financing, construction and the operation of public infrastructure, including highways. Involving the private sector often requires a law permitting the public sector to allow for transferring responsibilities into private hands, while the regulatory conditions define the boundaries that cannot be passed.

In most cases, the private sector takes responsibility for the design, construction and operation of the proposed road. Tolls provide the revenues on which basis private investors plan to make a profit. There are both pros and cons involved in using the private sector. There is also a good volume of experience, and under the correct conditions, the privatization approach has substantial potential.

The most frequent form of privatization used is called BOT, representing Build, Operate and Transfer (transfer back to the public sector). The advantages to the public sector (particularly the highway sector) from private sector investment and operation are (1) less government budget requirements by using private investment, (2) potential for lower capital costs and operating costs for the nation as a whole, (3) experience indicates a shorter construction period (assuming there is no major conflict between the public sector and the private investment group), and (4) in effect, much of the risks and costs are transferred from the public sector to the private sector. The potential of using private road investment needs to be evaluated, and at the same time, the legal and regulatory structure must also be examined in order to determine whether changes and/or additions are required.

Chapter 4 provides an extensive review of the indicated statutory and regulatory conditions in the SADC countries studied that need to be changed, modified, eliminated or replaced.

Although the private sector needs to be considered as a potential investor in roads using a BOT model, private sector investment can take various forms. For example, the private sector can be used extensively for more narrow areas such as construction, engineering, maintenance, management roles and other areas in which they are more knowledgeable and efficient.

2.2.7 Budget Problems

2.2.7.1 Maintenance

Maintenance is frequently under-budgeted in the context of setting the investment budget for a proposed new road. Because of lack of budget, new roads are often under-maintained in terms of annual/periodic requirements as well as major rehabilitation that may be required every five to seven years depending on climate, traffic volumes and other forces. Consequently, it is essential to develop a planned maintenance program designed to ensure that roads are effective, provide good services and keep vehicle operating costs (especially trucks, since they are critical for economic development and growth) as low as possible.

2.2.7.2 Management and Operations

The budget problems associated with highway maintenance are in many ways comparable to the management and operational aspects of highway management. It is quite clear that increased funding will be required if the recommended actions and changes are to be effectively implemented for both management and operational needs. In most of the SADC countries, donor funding has assisted in developing a highway management system approach which, following donor objectives, has been aimed towards rationalizing road management decision making using an approach that depends on sound technical and economic criteria. This is an appropriate strategy that should be implemented as quickly as possible within the current legal and statutory environment (and as noted should be modified as required).

A highway management system that is integrated and coordinated has two major sources of strength for implementing its programs. The first consists of the collection and development of a data and information base. Such a database can be used to perform the economic, engineering and road design, in addition to road maintenance and operations. The second area involves conducting the decision process using the decision support system, including management applications of processing relevant data and information using the most up-to-date methodology in order to make decisions related to the implementation and management of the road network.

The proposed development of the highway data base and the application of the various decision making methods will require additional budget to purchase the needed equipment. This equipment will include a road planning system, a pavement management system, a material information system, a traffic information system, a bridge management system, a maintenance management system, a general information and mapping system and an administrative and cost control system. While these measures will require a larger budget, if carried out efficiently, the resulting benefits more than compensate for the additional costs.

2.2.8 Cost Recovery and Financing

The most commonly used user charges in the SADC countries studied are fuel levies, licenses and transit fees. Other countries throughout the world use a much broader base of funding. This includes (1) toll roads and the tolls on bridges, (2) overload charges/fees, (3) duties on imported vehicles and luxury products, (4) excise taxes on local vehicles (set according to vehicle size and cost, and including oil, tires

and other consumables), (5) tax on vehicle parts, (6) taxes/royalties from petroleum to finance highway development expenditures, (7) "sin" taxes in the form of excise taxes on tobacco, alcohol and other beverages, (8) financial transactions, (9) toll financing or concession financing, and (10) revenue bond financing

Although the above list does not include all revenue sources, it illustrates the considerable range of options that is available. In terms of actual application, each source would have to be evaluated in terms of equity, incidence and ease of implementation. It should be noted that all of these sources have been applied successfully and are consistent with setting an appropriate user charge.

2.2.9 Earmarking Revenues For Highways

Earmarking revenues for highway construction, maintenance and operation is hardly new and has been used for many years by many countries. Earmarking has its own problems as does the Road Fund/Trust Fund established to receive funds to be assigned for highway use. The use of a Trust Fund, Road Fund or a variation of Earmarking all require that they be carefully evaluated to determine the feasibility of applicability and cost recovery. The success of a Road/Trust Fund or an earmarking approach depends on the degree to which the funds are fully allocated for highways. The collection of funds for highways is specifically related to cost recovery.

Because of the lack of sources for road system management and road maintenance, a number of countries have "earmarked" public revenues for road maintenance management as a strategy to assure that funds are available for highway finance, including maintenance. Where toll roads are involved or are being considered for highway finance, it should be kept in mind that toll revenues are to be preferred to fuel taxes (the most frequently used revenue source) because of the closer correspondence of toll revenues to benefits.

The use of "earmarking" can serve the purpose of assuring a continued and adequate flow of resources for maintenance programs. It should also be noted that "earmarking" may be justified for debt service, especially where capital outlays for highways are often financed through borrowing.

2.3 Institutional Issues - Road Management Initiative

2.3.1 History/Background

The Road Management Initiative (RMI) in Africa evolved from the Road Maintenance Initiative launched in the late 1980's to early 1990's by the World Bank and the UN Economic Commission for Africa. The RMI provided intensive support for improved road maintenance to participating countries.

From the 1960's onwards, African countries have heavily invested in building and extending their road networks to meet development needs. By the early 1990's, there were nearly 2 million km of roads in sub-Saharan Africa, including 610,000 km of main road. In the SADC region, there were 100,000 km of primary road, 300,000 km of secondary road, and almost 500,000 km of tertiary road. These figures include about 100,000 km of paved and 450,000 km of gravel road. This infrastructure represents an enormous investment and asset. However, these assets have been poorly managed and maintained despite enormous expenditures on maintenance. The roads have been managed by public sector institutions that were ineffective in their tasks and were not responsive to market conditions or stakeholder needs for service.

These poorly maintained road systems imposed a heavy economic cost on stakeholders. As an impediment to competitive national economic platforms, the poor maintenance also resulted in a huge opportunity cost to the southern African nations in terms of restricted investment, commerce and economic productivity.

The Road Maintenance Initiative examined the underlying causes of this poor maintenance and management performance, defined several root causes, and developed an action agenda for addressing these causes.

2.3.2 Key Principles of RMI

The RMI identified the institutional framework within which roads are managed as the primary cause for poor maintenance policy and implementation. Specifically, road management suffered from

- Ineffective objectives and techniques. Roads were managed as a social service and by bureaucratic methods. Roads were not managed as part of the market economy, with clear demands for performance, cost control and service provision,
- Poor salaries and other conditions of employment within road agencies,
- Lack of clearly defined responsibilities,
- Ineffective and weak management structures, and
- Lack of managerial accountability.

Thus, the issues relating to maintenance were seen to be managerial in nature, and the focus of RMI was enlarged to deal with road management, encompassing road maintenance.

The agenda of the Road Management Initiative is based on, what RMI terms, the "commercialization of the road sector" bringing roads into the marketplace and placing them on a "fee-for-service basis". Clearly, the principles and changes implied by this agenda must dovetail with the fact that roads have been operated as a monopoly and, at least in the near term, were operated by government institutions.

2.3.3 Basic Elements of RMI

Four supporting RMI elements ("building blocks," as termed by Ian Heggie, World Bank) are considered vital as part of the RMI effort to support commercialization. The elements are interdependent and mutually reinforcing. These are

- i Ownership Achieving active support of road users
As the stakeholders are the people and organizations that will pay for the roads, public support is needed for necessary levels of road funding. Moreover, stakeholders provide some mitigation of the monopoly nature of much road management and can be involved in road management at national, regional and local levels.
- ii Financing Establishing an adequate and stable source of funds
For governments with pressing needs and limited budget resources, mechanisms are needed to both collect sufficient funds and to dedicate them (earmark them) for the road sector. The charging of cost-related fees, combined with stakeholder involvement, creates clear market signals and pressure for cost-effective management, and relates costs clearly to maintenance levels.

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- iii Responsibility Establishing an organizational framework for managing different parts of the road network and supporting and related functions
Responsibilities need to be clearly assigned amongst and understood and accepted by different government departments, levels of government, individual road agencies and other groups. The relationships between government levels and institutional elements needs to be clearly defined. Special institutional arrangements may be needed to support regional networks.
 - iv Management Management of road agencies (all institutional elements in the framework) on the basis of sound business and organizational principles
The terms and conditions of employment are often problematic, with the private sector (or neighboring countries) offering better arrangements than government service. This imbalance needs to be corrected. The ability to manage the human resources with autonomy is important. A clear mission focus and focus on measurable organizational and individual performance are crucial. The ability of the road agencies to make autonomous decisions in support of their "corporate" objectives and "contractual" obligations is also vital.

To achieve these building blocks, the RMI recommends several supporting elements

i Ownership - Involving Road Users

Joint Steering Committees,
Advisory Boards,
Roads Boards,
Steering Committees to include road user representatives, and
Road Safety Councils

ii Funding Instruments and Mechanisms

Dedicated Road Fund,
Various forms of user charges,
Clear method for setting tariff levels,
Government budget allocations to the Road Fund for urban and perhaps non-economic roads,
Clear allocation procedure and funds management,
Clear Road Fund management structure with stakeholder representation, and
Clear and independent Audit arrangements

iii Institutional Options

More focused Transport (or Road) Ministry,
Roads Board,
Road Authority, and
Road Fund

iv Sound Business Practices for Road Agencies

Defined mission,
Clear management objectives,
Measurable targets,
Clear management structure,
Autonomy of managerial action,
Defined human resources requirements,
Effective, responsive MIS,

Commercial cost accounting system,
Effective oversight arrangements, and
Regular reporting system

The private sector is a vital part of the RMI in terms of carrying out work in the sector. Effective use of the private sector for contracting, design, supervision, planning, auditing, laboratory, research, inventories, and other functions introduces business methods, market-based quality and cost control and stakeholder commitment into the roads sector. The public function becomes more focused on policy, regulation and macro planning, and public oversight of the sector.

2.3.4 Implementation of RMI in the SADC Region

Almost all countries in the SADC region (at least before its recent expansion) have committed to the principles developed through the Road Management Initiative. Malawi, Mozambique, Namibia, Tanzania and Zambia are formally participating in the RMI. Other countries - Botswana, Lesotho, South Africa and Zimbabwe - while not formally part of the RMI, have adopted its many of its principles.

Each of these countries is making individual choices with respect to the design of its sectoral framework and the choice of RMI-type elements and means of their implementation. As implementation has been difficult for some nations, several countries have proceeded further than others within the region. However, in all these nations, the basic assumptions that governed the road sector until the late 1980's have changed. For instance, the expectations of government, stakeholders, donors and lenders now largely reflect the principles and recommendations of the RMI.

The support of bilateral and multilateral agencies is still very important to many countries in the region. These agencies are also largely supportive of the RMI principles and initiatives. This has led to more consistency of viewpoint, policy and programming, better coordination amongst all agencies, and dissemination of the RMI message throughout the region.

2.4 SATCC Initiatives

SATCC (Southern Africa Transport and Communications Commission) has assumed a coordinating and advocacy role for much of the effort towards regional vision and integration for the transport sector. SATCC is working with its member countries to define and introduce common and integrative policies, standards, user charges and fee structures.

The 1996 SATCC Protocol on Transport, Communications and Meteorology is the leading statement of the direction to be taken by the SADC nations regarding the structure and operation of the road sector. The Protocols are in line with the recommendations of the RMI. The protocols include sections dealing with the following²

<i>Road Infrastructure</i>	Adequacy of the network, Minimization of total transport costs, Preservation of assets (Section 4.1)
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² SADC Transport Efficiency Project (STEP) Road Network Management and Financing, January 1997

<i>Road Infrastructure Policy</i>	Monitoring adequacy and quality, Commercialization, Coordination, Competitive tendering for works, Stimulation of contracting industry (Section 4 2)
<i>Regional Network and Route Numbering</i>	Regional Trunk Road Network (RTRN) (Section 4 3)
<i>National Roads Authorities</i>	Effective utilization of funds, Involve private sector in management, Promote competition, Open tender system, Accountability, Public relations and ownership, Collaboration with transport and traffic, Road classification (Section 4 4)
<i>Funding Sources</i>	Road user charging and private sector funding, Transparency in road funding, Dedicated road funding, Cross-border charging of foreign vehicles, Improve economic efficiency, Equity for road users, Non-discrimination of foreign users, Harmonization of road user charges for various vehicle types and uses (Section 4 5)
<i>Regional Funding Initiative</i>	Agreement on cross-border charging, Research into adequacy of road funding, Transparent strategies for road funding, Establishment of a regional road maintenance fund (Section 4 6)
<i>Harmonized Technical Standards</i>	National road management systems, Appropriate technical standards, Development to accord with RTRN, Harmonized standards of non-RTRN roads (Section 4 7)

SATCC is supported in this work by considerable commitment from the SADC countries. International agencies such as USAID, the SADC Transport Efficiency Project (STEP), the World Bank, European Union and CIDA are also contributing to SATCC's efforts in ways that are consistent with the principles described above, with the Road Management Initiative, and with the vision of greater economic integration and competitiveness for the region.

CHAPTER 3

INSTITUTIONAL STRUCTURES

3.1 Introduction

The premature deterioration of the road network in southern Africa and the inability of road administrations to keep pace and maintain the network at appropriate standards is the most urgent problem facing road administrations. To overcome this problem, the World Bank has advocated reforms for highway management institutions. Additionally, the SATCC Protocols on Transport which were adopted in 1996 also urge SADC states to reform and establish new institutions such as autonomous road authorities.

During the past decade, virtually all of the countries under study as well as other countries in the region have restructured or are in the process of restructuring their roads sector and institutions responsible for highway management. This is being carried out in accordance with the World Bank's RMI model and the SADC Transport Protocols. In some countries, such as Namibia, Malawi, Mozambique, Tanzania and Zambia, this has meant an almost total reorganization of the roads sector, including the adoption of a national transport policy, new legislative and regulatory frameworks, and the establishment of new institutions such as road boards and road funds. In other countries, such as Botswana, Zimbabwe and South Africa, less dramatic actions have so far been taken. Nonetheless, these restructuring efforts and new institutional arrangements invariably have followed the World Bank's Road Maintenance Initiative (RMI) approach. The stated objectives of the Road Maintenance Initiative which began in 1989 (and is now known as the Road Management Initiative) were (1) to assist countries in establishing the policy and institutional changes necessary to improve maintenance, and (2) where necessary, to assist countries in developing plans to upgrade essential road to good conditions by the year 2000. The institutional vehicles to achieve these objectives are the establishment of road authorities, road boards and road funds.

3.2 Road Authorities and Other Operating Administrative Frameworks

This chapter examines the institutional structures for highway management in the countries under study and assesses the strengths and weaknesses of these institutions on improving highway management. The Road Authority (or, more broadly, Road Agency) is one of three institutional structures advocated by the World Bank under the RMI. The others are a Road Board and a Road Fund. Generally, the Road Agency has overall financial and managerial autonomy for highway management. The Road Authority is usually nominally responsible to the regulatory authority, often the Ministry of Transport. Its creation generally requires special legislation to implement policies proposed by the governing regulatory authority.

Table 3.1 presents the current status of implementing the institutional structures and their current implementation status as proposed under the RMI-model. Further details on the institutions are contained in the individual country reports presented later in the chapters.

Table 3 1 - Institutional and Regulatory Framework for Road Authorities

Country	Institutional Structure	Implementation Status
Botswana	Road Agency	A currently ongoing Institutional Study recommended a Road Authority as an autonomous agency for road operations, maintenance and construction. A Road Board and Road Fund have also been recommended.
Malawi	Road Agency	Recently passed legislation and has created a Road Authority.
Mozambique	Road Agency	An updated Road Act that will establish a National Road Administration is under consideration.
South Africa	Road Agency	Legislation for a National Roads Agency was approved in 1997 and is expected to be implemented in early 1998.
Tanzania	Road Agency	Recommendations for a Road Agency are still under study.
Zambia	Road Agency	Recommendations for a fully autonomous Road Agency under a modified structure led by the National Roads Board are under consideration by Cabinet.
Zimbabwe	Road Agency	Commitment made by Ministry of Transport and Energy for a National Road Authority.

Primary Source: *Transport and Communications Integration Study for Southern Africa* Draft Final Report Vol 2 1997

As Table 3 2 on the following page reveals, collectively, the Road Administrations for the countries under study are responsible for maintaining some 729 626 km of roads. Of this amount, 4.4 percent or 32,058 km are classified as part of the regional trunk road network.

Table 3 2 - Road Network Classification in Selected Countries

Country	Main Roads Paved (kms.)	Main Roads Unpaved (kms.)	Rural Roads (kms.)	Road Network Total (kms.)	Regional Trunk Road Network *
Botswana	3,663	5,098	9,566	18,327	3,160
Malawi	2,849	2,207	2,135	5,192	1,772
Mozambique	4,309	8,125	13,758	26,192	5,298
South Africa	57,034	125 393	258,000	440,427	6 572
Tanzania	3,349	24 662	59,989	88,000	6,973
Zambia	6,476	14 524	45,000	66,000	5,021
Zimbabwe	7,120	11 277	67 091	85,488	3 262
TOTAL	84,800	191,286	455,539	729,627	32,058
% of Road Network Total	11 6	26 2	62 4	100 0 **	4 4

Primary Source *Transport and Communications Integration Study for Southern Africa* Draft Final Report Vol 2 1997

Notes * Figures in column and percentage share are included in totals column

** Row does not total to 100% due to rounding

3 3 Country Reports - Road Administration

3 3 1 Botswana

The Department of Roads in the Ministry of Works, Transport and Communications (MWTC) is responsible for the National Roads (Primary and Secondary) while the other roads are managed by local and urban councils which are linked to the Ministry of Local Government, Lands and Housing

MWTC classifies roads in Botswana as Primary, Secondary, Tertiary, Access and Urban. The Primary roads are international routes linking populations of more than 10,000 people. Secondary roads are roads linking population centers of more than 2,000. In comparison, tertiary and access roads are mostly local in nature and located in the rural areas. This study focused primarily on the primary and secondary road network. Botswana's total network consists of approximately 18,000 km of which some 3700 km are paved.

While a road standard manual is in use, the road maintenance manual is still being drafted. A system by which roads can be upgraded from one category to another is not available.

While maintenance performance has been relatively good, there are a number of road management problems. Three bottlenecks for improving road management include inadequate staffing levels, inefficient institutional structures, and the absence of a separate road fund for road maintenance.

A currently ongoing institutional study of the road sector has recommended major modifications in the sector's institutional and financing framework. A Road Board has been proposed to represent stakeholders and to have active overview responsibilities for the sector. A Road Authority has been proposed as an operating agency for road maintenance and development and dedicated road fund has been prepared. Outsourcing to the private sector, already government policy, is to increase.

3.3.2 Roads Administration - Malawi

The passage of the National Roads Authorities Act in 1997 created renewed interests in Malawian road activities. Stakeholders (i.e., road users, freight forwarders, transporters) believe the government is sincere in its efforts to involve the private sector in improving regional transport. Under the Roads Act, the new Roads Authority will significantly increase the emphasis on professional road management as well as fund increased wages, benefits, new construction and road maintenance. The donors voiced their belief that the government is beginning to implement good road policies. As a result, the donors have expressed commitment to increasing funding for road activities provided the government meets certain conditionalities such as transparency of contracting, funding common and periodic maintenance, establishing and monitoring weight controls and accomplishing the tasks by use of private sector contractors. Currently, most of these activities are accomplished by force account by the Ministries of Works and Transport.

3.3.2.1 The National Roads Authority - Malawi

The Authority was created by the National Roads Authority Act of 1997. The Act provides for the National Roads Authority to (1) oversee the maintenance, rehabilitation and development of public roads and related activities, (2) authorize the raising of funds for maintenance and rehabilitation of public roads, (3) advise the Ministers of Works, Local Government and Transport on road activities, and (4) establish an annual national road program and oversees the overloading of vehicles on public roads.

The National Roads Authority is to be guided by a Board whose composition includes both public officials and major private sector representatives. They include (1) a Board Chairperson, (2) private stakeholders (e.g. representatives from the Road Transport Operations Association, the Bus and Taxi Operators Association, Tobacco Growers Association, Tea Growers Association, the Chamber of Commerce and Local Government), (3) the Construction and Safety Council, and (4) three ex-officio government members. The composition of the Board of National Roads Authority clearly indicates that key private

sector stakeholders will play a major role in highway management decision-making in Malawi. Conversely, public officials are expected to play a lesser role.

3 3 3 Mozambique

Highway management in Mozambique is a three-tier structure whereby the Ministry of Public Works and Housing is at the top, *Empresas de Construcaco e Manutencao de Estradas e Pontes* (ECMEP), a parastatal, is in the center and road contractors are at the base. The Ministry of Public Works and Housing has overall responsibility for highway management policy. Operational responsibilities for planning and programming road maintenance and construction is executed by the Department of Roads and Bridges (DNEP), a parastatal organization. At the provincial level, road operations are directed by the Provincial Department of Roads and Bridges which covers the Mozambique's ten provinces.

Although a number of domestic private contractors undertake civil works, DNEP relies primarily on *Empresas de Construcaco e Manutencao de Estradas e Pontes* (ECMEP), also a parastatal, to carry out its road maintenance and construction work.

3 3 3 1 Department of Roads and Bridges (DNEP)

DNEP has primary responsibility for managing the highway system in Mozambique. Its main role is to plan, control, supervise and manage the road system. DNEP provided information on operational and functional responsibilities, investment program, resource capacity and maintenance programming. Much of the rehabilitation of Mozambique's road system has been undertaken under the World Bank-led ROCS I and ROCS II project. Because DNEP lacks capacity to maintain the road system, the department contract out its maintenance, rehabilitation and construction works primarily to ECMEP, but increasingly a number of domestic contractors have been awarded a significant volume of work.

DNEP is responsible for the development and maintenance of the classified roads consisting of the national road network. Although DNEP has limited capacity, it is the only government agency with the management capacity and geographical presence to cover the entire country for road development and maintenance. The Ministry of Public Works and Housing to which DNEP reports has the ultimate responsibility for highway management and exercises this functional responsibility through DNEP.

DNEP's highway maintenance capacity has also been constrained by its lack of technical staff. To address this problem, DNEP is training some 60 civil engineers to assist with managing the highway system. Highway contractor capacity is also a problem in Mozambique. Under the ROCS I and II, DNEP has improved contractors' capacity to undertake road works from 4 to 44 firms. Much of this work involves routine maintenance and is being done by small contractors, including NGOs, on tertiary and secondary roads.

3 3 3 2 *Empresas de Construcaco e Manutencao de Estradas e Pontes*

As noted above, maintenance of Mozambique's road system is primarily undertaken by the quasi-parastatal *Empresas de Construcaco e Manutencao de Estradas e Pontes* (ECMEP). Due to capacity constraints, ECMEP is unable to maintain the entire road system. As such, contract maintenance was introduced under the World Bank-led road rehabilitation program, ROCS I and ROCS II. Presently, some 44 privately-owned small to large contractors are active in providing road maintenance services in Mozambique.

Ironically, ECMEP was to be restructured as a public corporation and eventually privatized under the World Bank roads program. However, to date, ECMEP has managed to elude the process because of potential dislocations/disruptions at a time when its services are most needed.

3.3.4 South Africa

During the past sixty-five years, South Africa's administration responsible for highway management has undergone a number of structural changes. These changes have affected all areas of highway management, including policy, planning, road pricing and user fee collection, road maintenance functions, and road construction, among others. Moreover, the administration of roads considered a number of possible structural and legislative choices that included (1) lack of central control with a largely uncoordinated system of roads serving local needs, (2) central government control whereby the national government assumed the main responsibility for roads, (3) central government control with the national government exercising responsibility for policy formulation and legislative development, and (4) a free market approach whereby ownership of road assets and responsibility for performance is transferred to the private sector.

However, it has been only in the past few years following the adoption of the new constitution in 1996 that the key roles, functions and responsibilities for highway management have been rationalized. This has permitted the introduction of highway structure that is coherent, reduces national and provincial tensions and improves network coordination and management.

The key players involved in managing the national roads of South Africa include the National Department of Transport (NDOT), the National Roads Agency, the National Roads Board and the National Road Fund.

3.3.4.1 National Department of Transport

The National Department of Transport (NDOT) is responsible for the primary road network classified as national roads. NDOT organizational structure is typical for a highway authority. It has a central administration and a headquarters based in Pretoria and regional offices in Pretoria, Bloemfontein, Capetown, Port Elizabeth and Pietermaritzburg. NDOT has overall responsibility for highway policy development and coordination. Similar to many of the countries under study, South Africa has had to overcome the tension between the national road authority and the provincial administrations. This is especially onerous as South Africa's network classification scheme classifies roads as national roads or provincial roads. National roads account for 6,141 km or about 1.3 percent of South Africa's total network of 487,637 km.

3.3.4.2 Provincial Roads Department

At the provincial level, roads not classified as urban, rural or municipal roads are declared provincial roads. The Provincial Roads Management Department is responsible for managing the provincial roads. Provincial roads represent some 36.2 percent or 176,286 km of the total road network.

3 3 4 3 National Roads Agency

In mid-1997 South Africa's new parliament approved legislation to create a National Road Agency. While the National Road Agency has been staffed and assumed some duties in the past months, it is not fully operational. The National Road Agency has the responsibility for (1) long-term planning, and programming for national roads, (2) designing and setting standards for roads, bridges, and materials, (3) constructing, maintaining and improving the national road network, including the toll road system, and (4) managing the national road network.

3 3 5 Tanzania

Administration of roads in Tanzania is carried out by two cabinet level offices. These include the Ministry of Works and the Office of the Prime Minister. Operationally, road management is divided between a Central Roads Board and a National Roads Board. These are discussed in the section on road boards.

3 3 5 1 Ministry of Works

Road management in Tanzania is primarily the responsibility of the Ministry of Works (MOW) and the Prime Ministers Office. The MOW is responsible for the Trunk and Regional Roads. However, most stakeholders interviewed believed that, as a result of a recent study, the current institutional arrangement would soon change. More specifically, a recent consultant study reportedly made a number of far-reaching, but not new, proposals, including the creation of a National Roads Board, a National Roads Management Agency and establishment of a new Roads Fund. The key feature of the study is the recommendation for a National Roads Management Agency. This Agency would be responsible for executing activities for the trunk road network. Responsibility for the Regional and District Roads would pass to the District Authorities. This Agency would assume most of the technical, operational and implementation functions currently carried out by the Department of Roads of the Ministry of Works.

3 3 5 2 Office of the Prime Minister

The Office of the Prime Minister is responsible for district and local roads. The Office administers the Regional Road Fund, which allocates funds to the District Councils for district and local road maintenance. Funds for the Regional Road Fund represent about 20 percent of the revenues from road user charges and are primarily derived from duties and excise taxes on vehicles and spare parts.

3 3 6 Zambia

Road administration and management in Zambia is dispersed. Presently, road management functions are carried out by at least four separate government agencies. These include the Ministry of Works and Supplies, whose Roads Department manages the main trunk road system, the Ministry of Local Government and Housing which manages the main urban and feeder roads, the Ministry of Agriculture, Food and Fisheries, which is responsible for roads leading to mainly agriculture camps and training facilities, and the Ministry of Tourism, which manages roads in parks and tourist areas.

Other administrations involved in the roads management include the Ministry of Communications and Transport whose role involves legislation and policy development on road transport, the National Roads Boards, which is involved in the administration of funds for road maintenance and contract maintenance, and the Ministry of Finance and Economic Development, whose role includes budgeting and planning.

Such a large number of government agencies with various responsibilities for highway management is confusing and often complicates the process of prioritizing which roads will be maintained from an already limited road maintenance and rehabilitation fund. The persistence of this problem has led to calls by the National Roads Board, the World Bank and others for a road authority to centralize all road management functions under one agency.

3.3.6.1 Ministry of Works and Supplies

The Roads Department of the Ministry of Works and Supplies (MOWS) is the department primarily responsible for road management. Its responsibilities include, *inter alia*, supervision and inspection of civil works, development of contract specifications, operation of the HMS, management and maintenance of the Vehicle Weight Management System.

3.3.6.2 Ministry of Communications and Transport

The Ministry of Communications and Transport (MOCT) has the primary responsibility for transport policy in Zambia. Although the prospects for passage are unclear, presently, the MOCT along with the MOWS is leading an effort to establish a road authority for Zambia. Such an authority would centralize all road management functions. MOCT also plays a regional role in SATCC functions.

3.3.6.3 Ministry of Local Government and Housing

The Ministry of Local Government and Housing (MOLGH) also plays a key role in managing Zambia's highway system. MOLGH's main responsibility is in managing urban and feeder roads. MOLGH also competes along with the MOWS for road maintenance funds from the National Roads Board.

3.3.7 Zimbabwe

Zimbabwe in many ways lags behind other southern Africa countries in restructuring its highway sector. Zimbabwe has yet to establish a Road Board or Road Fund although it has a District Development Fund for communal land. The key agencies responsible for overall highway management of state roads in Zimbabwe are the Ministry of Transport and Energy (MOTE) and its seven provincial officers. Operational responsibilities for road maintenance and construction are vested in the Department of State Roads.

Rural roads are under the jurisdiction of the Rural District Council of the Ministry of Local Government and Rural and Urban Development. These roads are maintained by the District Development Fund, which covers some fifty-seven districts.

3.3.7.1 Ministry of Transport and Energy

The administration of roads in Zimbabwe is entirely a government enterprise. The Department of State Roads in the Ministry of Transport and Energy (MOTE) is responsible for the main road network. Road maintenance functions such as routine and periodic maintenance work for the trunk network are all planned and executed by the Ministry of Transport and Energy. Execution of the civil works is performed by seven government construction units for capital works. Although major rehabilitation work is done on a contract basis, units of the government also undertake patching and resealing. Key functions of the Department of State Roads include capital works and road maintenance. All planning, prioritization of road works,

survey work, some design work contract documentation and evaluation of tenders are done in-house
Contract awards are done by the Tender Board

The Ministry of Transport and Energy (MOTE) has proposed establishment of both a Road Fund and a Road Board Revenues for the Road Fund are to be derived from road user charges Administration of the Road Fund is to be undertaken by a Road Board, which is to comprise members of both the public and private sectors

However, under the proposed restructuring, the Department of State Roads under the MOTTE will have responsibilities for maintaining the regional main road or trunk road network, inter-provincial roads and inter-district roads consisting of about 18,000 km

The District Development Fund is responsible for all communal, resettlement and small-scale farmer roads Maintenance funds are to be provided by the national government

3 3 7 2 Ministry of Local Government and Rural and Urban Development

Rural District Council roads are the responsibility of the Ministry of Local Government and Rural and Urban Development Other roads such as those under the jurisdiction of the Rural District Council (about 6,818 km) which fall under the Ministry of Local Government and Rural and Urban Development will be supported by the MOTTE Maintenance of rural roads is carried out under the District Development Fund

3 4 National Roads Boards

The creation of National Road Boards to manage highway operations is one of the key institutional reforms taking place in the road sector in southern Africa Four of the five SADC countries (Malawi, South Africa, Tanzania, and Zambia) have established National Road Boards Other countries such as Botswana, Mozambique and Zimbabwe are actively considering establishing a road board Table 3 3 below summarizes the current status of implementing road boards in the countries under study

Table 3 3 - Institutional and Regulatory Framework for Road Boards

Country	Institutional Structure	Implementation Status
Botswana	Road Board	A currently ongoing study recommends the establishment of a Road Board with stakeholder cooperation which will have overview authority of the road sector including Road Authority
Malawi	Road Board	Created by law in 1997 Only the Chairperson has been appointed, other Board members have been nominated
Mozambique	Road Board	Under consideration
South Africa	Road Board	Reconstituted and endorsed by Cabinet in 1995
Tanzania	Road Board	Currently, a Central Roads Board and a Regional Roads Board A National Roads Board has been proposed but not yet established
Zambia	Road Board	Established in 1994
Zimbabwe	Road Board	Under consideration Legislation pending before parliament

Primary Source *Transport and Communications Integration Study for Southern Africa* Draft Final Report Vol 2 1997

3 5 Country Reports - National Roads Boards

3 5 1 Botswana

Botswana does not currently have a Roads Board or a Roads Fund Planning and prioritization are carried out by the Roads Department In addition, the Roads Department is also responsible for route location, design and tenders Tenders are evaluated by private consultants appointed by the Department Generally new construction and reconstruction are carried out by contracts to the private sector with minor civil works executed by the government Road improvements and maintenance are funded directly by the government

An ongoing institutional study has recommended the creation of a Roads Board The Board would be composed of stakeholders' representatives, and would have overview responsibility for the road sector It would manage the Road Fund and possibly serve as a Board of Directors for the Road Authority It would be responsible to the Ministry responsible for roads (The creation of a Ministry of Transport is also under discussion)

3 5 2 Malawi

The National Roads Board was created by legislation enacted in 1997 under the National Roads Authority Act. However, it is not yet fully staffed. Characteristics of the Board are (1) members are appointed by the Minister of Works, (2) the Chairperson is appointed by the Minister, (3) members must come from the Transport Operators Association, the Bus and Taxi Operators Association, the Tobacco and Tea Growers, local government, and national Safety Council, National Construction Industry, and ex-officio members of government shall meet once every two months as a minimum, and (4) shall be responsible for approving an annual road program. The participation of key private sector stakeholders in the National Roads Board is expected to significantly improve the prospects for introducing market-based decision-making in highway management in Malawi.

The Board's Chairperson has been appointed and has commenced his duties, other Board members are currently being selected.

3 5 3 Mozambique

Mozambique has not, as yet, established the Road Board that the World Bank-led ROCS II project envisaged in 1994. Presently, a draft decree to establish a Roads Board is under consideration by the Cabinet.

3 5 4 South Africa

South Africa has a long history of using Roads Boards to manage its highway network. South Africa established its first National Roads Board in 1935. The Board was abolished in 1948 because of tensions between the national and provincial administrations and replaced by the National Transport Commission. The National Transport Commission was to last some forty years, after which it was replaced the South African Roads Board (SARB). In 1988, the SARB was granted exclusive responsibility for planning, construction, maintaining and improving the national road network, including the toll road system of about 2,000 km of roads. The SARB is made up of 12 Board members, six of whom are to be representatives from non-governmental institutions, but not necessarily private firms. SARB, according to the Act establishing the Board, is to function as an autonomous body including the appointment of its own staff. Authority previously held by the National Transport Commission was transferred to the SARB.

The SARB was reconstituted in 1995 as part of a broader Cabinet scheme to restructure state assets. This led to efforts to refocus the SARB's methods of managing national roads and executing maintenance operations.

The SARB also administers the National Road Fund, which provides funding for road maintenance and new construction.

3 5 5 Tanzania

As indicated above, operational responsibility for road management in Tanzania is divided between a Central Roads Board and a Regional Roads Board. The Central Roads Board is responsible for administering about 80 percent of the Road Fund which oversees the main and regional roads. The Regional Roads Board is responsible for 20 percent of the Road Fund and oversees district and rural roads.

3 5 5 1 Central Roads Board

Tanzania established a Central Roads Board (CRB) in 1994 as a corporate body. The CRB has the responsibility to (1) provide guidance and oversight to the Ministry of Works and the Ministry of Communications and Transport on transport policy and highway management, as well as on staff issues, (2) advise the MOW on allocations and disbursement of funds, and (3) recommend amendments to laws and regulations to improve highway management.

The CRB consists of a Chairperson appointed by the Minister and eleven members. The Director of Roads of the Ministry of Works also serves as a member of the CRB and acts as its Secretary. Other Board members include five representatives from other public agencies: the Ministry of Works, the Ministry of Transport and Communications, Ministry of Finance, Ministry of Local Government, Ministry of Home Affairs, and the Ministry of Planning. Representative from the private sector include the Chamber of Commerce, the Institution of Engineers, the Transport Operators Association, and the Automobile Association. Election of the Vice-chairperson is the prerogative of the Board. The CRB has a full-time secretariat in the Office of the Director of Roads in the Roads Department.

Recommendations to create a new National Roads Board have been proposed. The Board would fulfill a regulatory and supervisory function on behalf of the Ministry but would not have authority over any ministries. The Board would consist of both public and private sector members. The Board could enter directly into agreements with agents or representatives responsible for managing defined sections of the road network.¹ The NRB would be responsible for management and use of the Roads Fund and any other funds set-aside for road construction, maintenance and/or management. Independent audits of the Board and the Fund would be required.

3 5 5 2 Regional Roads Board (RRB)

At the regional level, there is a Regional Roads Board which also provides road management advice and authorizes contract work. The Regional Roads Board is directed by the Office of the Prime Minister. The Minister of Finance allocates 20 percent of the Road Fund to the RRB to improve urban and rural district roads through the District Councils.

3 5 6 Zambia

The National Roads Board (NRB) was established by Statutory Instrument in 1994 to administer and manage the Road Fund. Presently, the NRB is accountable to the Ministry of Communications and Transport. The NRB comprises a twelve-member Board of Directors that includes a Chairperson and seven private sector officers and five government-appointed non-voting ex-officio members. Private sector involvement includes representatives from Chamber of Commerce, FEDHAUL, Automobile Association, farmers, Institute of Engineers, Institute of Transport, and Copperbelt University. All private sector representatives are elected by their own organizations. The NRB elects its own Chairperson and Vice-chairperson. Ex-officio public agency members are selected from the Ministries of Finance, Works and Supplies, Transport and Communications, Local Government and Housing, and the National Commission

¹ Agents in this context are defined as any organization or group public or private, that undertakes maintenance or other road related work under contract to the government.

for Development Planning Board members are elected for a three-year term. The NRB is managed by a secretariat directed by an Executive Secretary and supported by a five person staff of engineers.

In addition to advising the Ministry of Finance on the level of road tariff (i.e., fuel levy), the NRB allocates funds among different road agencies and geographical areas. Maintenance of the road system is primarily undertaken by the National Roads Board on a contract basis. This is because MOWS lack the capacity to maintain the entire road system. As such, contract maintenance was introduced under the World Bank-led road rehabilitation program.

The NRB uses the output developed by the HMS as well as inputs from its own consultants to set maintenance priorities and allocate maintenance funds for MOWS and Ministry of Local Government and Housing (MOLGH) managed road systems. The NRB has been criticized for not adopting the priorities of the HMS and for allowing non-technical and non-economic criteria (i.e., social and political criteria to be considered in its decision-making process). However, in an environment of resource constraints, this is, to some extent, to be expected. In contrast, the NRB suggests the HMS is biased towards asphalt concrete roads when traffic levels clearly do not support such road surfaces.

3.5.7 Zimbabwe

The Ministry of Transport and Energy (MOTE) has proposed the establishment of a Road Board. The Road Board would administer the Road Fund. Legislation for a Road Board had been expected to be approved by Parliament as early as the end of 1997. This legislation would establish a 10-member Road Board that would include 5 members from the private sector and 5 from the public sector.

Given Zimbabwe's success to date in maintaining its road system, there is not an urgent need to reorganize the road administration into a Road Board and a Road Fund along the lines suggested in the World Bank Road Maintenance Initiative². While this may be appropriate for some countries, especially those lacking in maintenance and human resources capacity, there is concern that the RMI model may not appear to be suitable for Zimbabwe (or at least that its introduction would cause disruption to a system that has thus far been managed with reasonable success). Undoubtedly, Zimbabwe is better positioned than most SADC member states to sustain its maintenance operations at a high level. However, under pressure from the World Bank Group to reduce public spending, the MOTTE has committed itself to the institutional reform process underway in the road sector.

3.6 National Roads Funds

The establishment of national road funds in the countries studied are the direct outgrowth of the World Bank's RMI strategy to improve highway management by targeting road user charges for road maintenance. This section discusses some of these funds' distinguishing features and assesses their status and the extent of their implementation on a country-specific basis. The section also examines the extent of private stakeholders' involvement in managing national roads funds.

² Similarly Botswana officials are considering altering a system that has managed to attain reasonable success. The Botswana believe however that stresses in the system will need to be dealt with proactively.

Table 3 4 - Institutional and Regulatory Framework for Road Funds

Country	Institutional Structure	Implementation Status
Botswana	Road Fund	An ongoing institutional study recommends the creation of a Road Fund managed by a Roads Board
Malawi	Road Fund	Created by legislation in 1997 The fund is now being organized
Mozambique	Road Fund	Established in 1989 to finance road maintenance and rehabilitation Revenues are derived from bridge tolls, fuel surcharges and border surcharges Fund operates under the Ministry of Public Works and Housing
South Africa	Road Fund	Established in 1935 by National Roads Act, amended in 1971 Finances routine and periodic maintenance, new investments, studies and research
Tanzania	Road Fund	Established in 1991 by Parliamentary resolution Also a component of the World Bank-led Integrated Roads Project Revenues are primarily derived from road tolls Other levies and taxes are also charged
Zambia	Road Fund	Established in 1993 and managed by a National Roads Board Revenues derived from fuel levies A heavy vehicle tax is under consideration Regulatory authority governed by Ministry of Transport and Communications
Zimbabwe	Road Fund	Does not yet have a fund although a fund is under consideration and legislation is pending

Primary Source *Transport and Communications Integration Study for Southern Africa* Draft Final Report Vol 2 1997

As Table 3 4 above indicates, five of the seven countries studied have road funds Only Botswana and Zimbabwe lag behind the other countries in establishing a road fund

Table 3 5 - Maintenance Expenditures and Needs (in US\$ million)

Country	GDP	Expend.	Req.	Short fall	Percentage Shortfall
Botswana	4,000	32 5	24 7	-7 8	--
Malawi	1,194	1 4	20 3	18 9	93
Mozambique	3,318	73 0	41 1	-31 9	-78
South Africa	133,857	724 0	1,346 0	622 0	46
Tanzania	2,500	35 4	35 8	0 4	0
Zambia	3,500	10 7	42 6	31 9	75
Zimbabwe	5,662	21 8	116 1	94 3	81

Note: The expenditure figures include donor contributions. Some countries are apparently spending in excess of their needs. In Mozambique the excess is due to the high costs of emergency maintenance (US\$59 mn) necessary to cope with the abnormal conditions.

The expenditure requirements estimates produced by STEP are based on standardized costs contained in the Cost Benefit Roads (CB Roads) model developed under the aegis of the Department of Transport in South Africa. The model allows for routine/periodic maintenance every 9 years with rehabilitation every 20 years. The Issue Paper and Outline Plan presented to Member States at the Road Network Management Financing Workshop in November 1996 recommended that each country should calculate its own maintenance needs for its sustainable network using country specific rates.

Source: SATCC/STEP P Mainwaring Road Network Management and Financing November 1996

Table 3 5 shows the presence of severe funding shortfalls for road maintenance in the region, most notably in Malawi (93 percent), Zambia (75 percent) and Zimbabwe (81 percent). On the other hand, Tanzania has essentially no shortfall. At first look, the 81 percent shortfall in Zimbabwe is perhaps surprising, given the quality of Zimbabwe's network. The relatively low shortfall in Tanzania also stands out.

Severe shortfalls of funds for maintenance is a problem experienced by many developing (and also developed) countries. A significant contributing problem in several of the SADC countries is that of capacity and institutional capability, involving poor planning and implementation of maintenance objectives. The problem may also reflect the extent to which appropriated funds were not, in practice, allocated to meet maintenance requirements (but were perhaps unspent or diverted for other purposes).

In Tanzania, the Road Fund has been a success and has been fairly well managed. It has provided funding for approximately 85 percent of maintenance needs. Tanzania has also benefitted from significant donor support. In recent years there has been enormous (donor-supported) investment in road upgrading, and routine and periodic maintenance costs would therefore be expected to be relatively low for some time. (This is also the case in Mozambique.) This perhaps explains why there is no shortfall in Tanzania between needs and actual expenditures for maintenance, compared with major shortfalls in Malawi, Zambia and Zimbabwe.

It should also be noted that the underfunding of maintenance activity is recognized by the SADC countries as an issue. For example, increases of funding are being planned or considered in Malawi, Mozambique and Zambia.³

3.7 Country Reports - Road Fund

3.7.1 Botswana

An ongoing Institutional Study of the Botswana Road Agencies for the Ministry of Works Transport and Communications recommended that Botswana establish a Road Fund. This Fund is still being designed by the study team and is not yet in place.⁴ It is proposed that the Road Fund be managed by a Road Board which may also serve as the Board of Directors for a road authority run on business principles. Although the details of revenue generation are to be determined under a separate study, the Road Fund is expected to derive its revenue from levies and fees imposed on road users as well as from allocations from the National Budget. The following user charges are currently being considered: fuel levies, road tolls, transit fees, license, permit, weight distance fees, import duties and excise taxes on vehicles and spare parts.

As recommended in the Institutional Study, the Road Fund is to be established such that it finances the Road Authority (and local roads units) to undertake all ongoing road operation and road maintenance. Funds for construction activities will also be allocated to the Fund.

³ Certain countries – Malawi, Mozambique, Tanzania and Zambia amongst them - have a relatively high requirement for periodic maintenance and road reconstruction activity, and routine road maintenance funding requirements may, in the short term be an anomalously small percentage of expenditure requirement. The degree and timing of donor support may also account for some of the numbers.

Expenditures may also be artificially restricted because of delays in transferring funds, or because of institutional inability to spend the allocated funds. Mozambique for example has a continued shortfall of 60 percent in funding of periodic maintenance. Its Road Fund receives only 60-65 percent of user fees collected from tolls and fuel charges, and experiences severe delays in transfer from MPF. Because of staffing shortages Botswana has sometimes been unable to spend its allocated road budgets.

Zimbabwe, on the other hand, does not have a road fund (Maintenance is funded from general Government revenues), and possesses relatively greater institutional capacity than many SADC countries. Its network is in fairly good shape, and hence periodic and reconstruction requirements may be proportionately low. The underfunding, and severe political and budgetary problems in Zimbabwe does not bode well however, for the future condition of the country's network.

⁴Ministry of Works, Transport and Communications (1988) 'Institutional Study of the Botswana Road Agencies' Phase I Report prepared by Burrow Binnie Botswana Limited with J.E. Austin Associates and others, January 1998.

3 7 2 Malawi

Characteristics of the Fund are (1) revenues are to be derived from road user charges, primarily a fuels tax, but are also to include road fees, overload fines and vehicle licenses, (2) funds shall be used on roads, initially for maintenance but later construction, and (3) heavy penalty for misuse of funds

3 7 2 1 Income and Expenditures

The initial fuel tax was established at approximately one (1) kwacha (US\$ 0 04) per liter of fuel The initial estimate of funds for FY1998 is 245 million kwacha (US\$11 million) This is projected to increase to K313 million (US\$13 60 million) in the near term and longer term to K532 million The current years' maintenance budget is K75 million

3 7 3 Mozambique

The Road Fund was created in 1989 by a Statute passed by the Council of Ministers Its objective was to finance routine and periodic maintenance of the primary, secondary and tertiary roads administered by state and provincial bodies The Road Fund derives its revenues from bridge tolls, international transit fees and fuel taxes The fuel levy is assessed by a special Department of the Ministry of Finance Once fuel is withdrawn from bonded warehouses, a charge is assessed and paid directly into accounts of the Ministry of Finance

The Road Fund in Mozambique is administered by an Administrative Council The Council consists of seven members that include a Chairperson who is the Director of DNEP and the Mozambican road agency Other Council members include representatives from other government ministries, such as the National Planning Commission, the Ministry of Finance, the Ministry of Transport and Communications, the Ministry of Commerce, the Ministry of Agriculture, and the Ministry of Interior Although this is under consideration, there is no private stakeholder involvement in the Administrative Council

The Council is supported by a small secretariat The Roads Fund has a weak organizational structure Day to day management is performed by the Roads Fund Administrator, who is supported by a small technical staff Fund administration has been further weakened by high turnover in staff Since its inception in 1989, the fund has had no less than three administrators

Under the ROCS II project, the Government of Mozambique (GOM) committed itself to financing 100 percent of the routine maintenance requirements through the Road Fund from road user charges The government further committed itself to financing 40 percent of the periodic maintenance requirements also through the Road Fund Finally, from 1994 on, the fund was to increase by 10 percent per year until 100 percent is financed by GOM by year 2000 Additionally, any local contributions for road maintenance as defined by the financing agencies would also come through the Road Fund

3 7 3 1 Income and Expenditures

Over the five-year period from 1994 to 1998, the Road Fund was to disburse some US\$162 million for road maintenance and rehabilitation Full cost recovery to finance periodic and routine maintenance remains a problem for the Mozambican Road Fund Current estimates indicate that the Road Fund receives on average about 60-65 percent of user fees collected on bridge tolls and fuel charges This problem is further compounded by persistent delays by the Ministry of Planning and Finance to transfer

revenues to the Road Fund. These delays result in cash flow problems for DNEP and hinder its ability to contract out its work to ECMEP and private contractors.

3.7.4 South Africa

As previously indicated, South Africa's National Road Fund is administered by the 12-member South African Roads Board. The National Road Fund, unlike other road funds discussed in this section, provides funding for both road maintenance and new road construction, as well as research and technical studies. Since 1988, South African legislation provided for the National Road Fund to use a fuel levy to finance its highway management activities. However, this financing method was later abolished due to persistence of end of fiscal year budget surpluses that accrued to the fund.

Presently, South Africa does not earmark road user charges for road maintenance and development as do other countries in the region. Revenues for the National Road Fund are appropriated in the budget process from the General Revenue Fund. However, current policy changes envisage earmarking the fuel levy for the National Road Fund sometime in 1998.

According to the World Bank, South Africa has the best system in the region for allocating road funds. It is based on standard unit rate classified by type of road surface and volume of traffic for each maintenance activity, including both routine and periodic maintenance. The relevant rates are then multiplied by the length of road under the jurisdiction of the road agency to derive total budgetary requirements. Adjustments to the allocations are made to account for weather conditions and funding constraints. A more dynamic method of estimating cost and programming road maintenance that relies on actual road surface conditions is being planned.

3.7.4.1 Income and Expenditures

Similar to other countries in the region, South Africa has a backlog of deferred road maintenance. This is largely the result of budgetary constraints over the past ten years. Additionally, the inability to generate adequate revenues through proper road pricing (i.e. charging road users the full cost of providing road service) is also a major contributory factor. With respect to revenue, many of the charges attributed to road users such as licenses, permits, fees, and fuel taxes go into general revenues instead of being dedicated to road maintenance and development.

As for expenditures, current estimates indicate that South Africa's total requirement for road maintenance is about R2,000 million per year. However, given the method of funding roads, the country is expected to experience a shortfall of R1,860 million per year. Proposals to derive US\$0.06/liter from the fuel tax and earmark these funds for road maintenance are expected to substantially reduce the maintenance shortfall.

3.7.5 Tanzania

Tanzania's first Road Fund was established in 1991 through a Parliamentary Resolution. The objective of the Road Fund was to "cover the maintenance and rehabilitation of the major and core roads." The Road Fund derives its funding from road tolls and taxes imposed on fuel (diesel and petrol) sales at a rate to be decided annually by the Minister of Finance. Various other levies and duties collected from motor vehicle taxes and transfer fees such as licenses and registrations are remitted to the Road Fund. Similar to Mozambique, Tanzania's Road Fund also finances both road maintenance and road rehabilitation.

Several studies, including those funded by USAID, indicate that the Road Fund has been a success. There have been delays and some funds have never been properly allocated, but overall, the fund has worked. It has provided funding for approximately 85 percent of the identified maintenance needs, and has been fairly well managed. Roughly 80 percent of the funds have gone to the Ministry of Works and 20 percent to the Prime Minister's Office. Much of the civil works has been contracted to the private sector. In 1997/98, the Road Fund totaled approximately 40 Billion TShs.

The conclusions of a 1994 study of the Road Fund were that the Road Fund had no legal basis and did not, in practice, function properly. A separate study recommended the creation of a new fund. If implemented, the proposed new Road Fund would create a single Road Fund with clear legal status. The new fund would also clearly define the use and distribution of funds, be required to distribute funds monthly directly to the responsible Agency, and create one organization (the National Roads Board) which would be responsible for the management of the Fund.

The proposal is in line with recommendations of the Civil Service Reform Organization and corresponds with the Government's policy to decentralize to Districts. The proposal is in line with the SADC Protocol for Transport and along the lines recommended by the World Bank Road Maintenance Initiative. While it is expected that the TMG proposal will be approved, it is worth noting that, in 1995, an almost identical proposal was never enacted.

3.7.6 Zambia

Zambia's Road Fund was established in 1993 and is administered and managed by a National Roads Board. Income for the Road Fund is derived from fuel levies on diesel and petrol by the Zambia National Oil Company Limited. In addition, Parliament may also allocate other such funds as deemed necessary.

3.7.6.1 Income and Expenditures

The most recent financial statement of the National Roads Board indicates that as of 31 December 1997 total receipts amounted to 39.4 billion Kwacha, or, US\$23.9 million. The main source of this revenue was the fuel levy which accounted for approximately 90 percent of all receipts, or 35.4 billion Kwacha (about US\$21.5 million).

The National Roads Board, which administers the Road Fund, allocates funds for road maintenance to the Roads Department which has responsibility for maintaining the main, trunk and district roads. District councils are also allocated funds for maintenance of urban and rural roads. Allocations of road funds to the different road authorities are according to following proportions: the Roads Department, 40 percent, the District Councils, 40 percent and the Urban Councils, 20 percent.

The annual budget to maintain Zambia's core road network is estimated at US\$40-50 million. At current levels, the fuel levy is insufficient to cover the cost of maintaining the core road network. As such, external assistance is required to meet the road maintenance requirements. Because of the continuing shortfalls in the Road Fund, the Zambian Government is considering broadening the revenue base for road funds to include transit tolls, weigh bridge fines, road licenses and weigh bridge tolls.

3 7 7 Zimbabwe

Although the Ministry of Transport and Energy (MOTE) has proposed the establishment of a Road Fund, Zimbabwe does not yet have a road fund. Legislation for such a fund, which was expected to be passed at the end of 1997, is now pending before parliament. Revenues for the Road Fund are to be derived from road user charges. Administration of the Road Fund is to be undertaken by a Road Board, which is to comprise members of both the public and private sectors.

3 8 Role of Private Sector

The role of the private sector in road management and maintenance has been discussed throughout the preceding sections. The role and involvement of private stakeholders and service-providers in the region has evolved significantly in recent years throughout the region, in all of the countries studied. This role and its evolution is discussed in this subsection.

Until recent years, road maintenance and management were considered to be the purview of the public sector. Efforts to improve road sector management and maintenance were largely directed to improving the government institutions and their activities. Much of the maintenance activity was carried out by force account. Private consultants were only retained for important studies and some professional services, contractors, financed by the public budget, were engaged for important construction and periodic maintenance, and sometimes for routine maintenance.

In this environment, there was no clear distinction drawn amongst the functions of road sector regulation and overview, road sector management, and execution of works and provision of services. Private sector institutions were viewed with suspicion, if not hostility, by the governments in the region.

The evolutions of the past decade have redefined and clarified the expected roles of public and private institutions, and the partnerships between them.⁵ In the current and emerging environment the roles and expectations for private and public institutions have changed. Each are considered to possess comparative strengths. Market discipline and commercial/business approaches are increasingly seen as beneficial and desirable for road maintenance and management. Both private and public stakeholders perceive the government's strength to be that of establishing national policy, and regulating the sector. National policy is generally supportive of these new roles, and regional policies, as reflected in the Transport Protocols, for example, are also supportive.

In the search for improved road management and maintenance, the government-private sector partnership is being redefined, and new methods and approaches are being considered and adopted. Generally, market (and stakeholder)-responsive, more business-oriented institutions, such as Roads Boards and Road Authorities, are being established to manage and maintain roads. Typically, these institutions have significant private sector stakeholder participation in their governance. The private sector stakeholders are increasingly participating in road sector policy formulation and highway management decisions.

In concert with this change, execution of works and provision of services is considered to be a comparative advantage of private entities. Hence, to a growing extent, private contractors and service providers are being looked to for road maintenance and construction. Private entities are also being considered for a

⁵ This reflects similar, often more marked, evolution in other regions of the world.

large number of other services including, but not limited to studies, plant provision and maintenance, audits, laboratory services, research, and training. New contracting mechanisms are being developed and considered to encourage this new private sector role.

With few exceptions in the region, the government or sector management agency has outsourced to contractors and other private sector providers only for specific services. Concession arrangements and varieties of BOT-type arrangements are being considered as offering potential – but are not yet widely used. International experience has demonstrated the opportunities that this sort of public-private partnership can offer. The implementation of the Maputo corridor demonstrates that BOT-type agreements have the potential to be successfully implemented within the region.

Such arrangements, it should be noted, are not limited to road construction and maintenance. A basic premise of the recommendations presented in Chapter 8 of this document is that BOT-type principles can be applied to allow private sector to play a role in a number of road-related needs and services.

In line with this evolution, private sector institutions in the region, such as subsectoral associations and other stakeholder groups, are becoming more visible and vocal both at the regional (FRRFA, FCFASA, etc.) and national levels in trying to shape policies. Road freight and transporters associations in Zambia (FEDHAUL), Malawi (Road Transporters Association, a relatively new organization) and Zimbabwe (Transportation Operators Association) are particularly active, associations in Botswana and Mozambique are relatively weak. Associations in the region are also taking active steps in trying to find ways of being more directly involved in the management of road infrastructure in the region. This is illustrated by FEDHAUL's efforts in weighbridge management in Zambia. Governments are interested and participating in this process.

Many new private sector “players” are emerging in the region, responding to the new opportunities. These include more or less traditional entities, such as small, medium and large-scale contractors, providers and maintainers of plant and equipment, and providers of professional services. They also include new entities, such as financiers and concessionaires. Financiers and concessionaires showing interest in southern Africa are both from within the region as well as international.⁶

It should be noted that, at the moment, the private sector in the SADC countries vary considerably by country in terms of their number, technical capacity and resources. The legal provisions to enable the private sector to fully participate in road management and maintenance also vary by country.

Under the Transport protocol, SATCC Sectoral Committees are being restructured to accommodate a new public/private sector partnership. This proactive stance by the private sector (admittedly it is just starting) and the new attitude by governments in the region, in fact, provide the basis for possible private sector-led initiatives as recommended in this study.

⁶ Private Companies involved in the consortium for the Maputo Corridor N4 road concession (TRAC – Trans African Concessions) include Stocks & Stocks, Basil Read and Bouygues. Financing is from institutions such as Nedbank, Standard Bank Corp, Merchant Bank (STANBIC), INVESCO, Sanlam, Old Mutual and others. DBSA is also financing some of Maputo Corridor projects.

3 9 Findings and Conclusions

The review and analysis of the institutional structures (i.e., road authorities, road boards and road funds) for highway management in the seven southern African countries studied revealed a number of structural problems involving (1) the role and function of institutions, (2) administrative constraints, (3) policy and financial constraints, and (4) public and private industry capacity constraints. The inability of these countries to adequately address these problems either individually or regionally will adversely affect their efforts to achieve institutional sustainability and a system of better highway management.

One of this study's most important findings is the extent to which private sector stakeholders (e.g., road transport operator associations, freight forwarders, major shippers and receivers, commercial enterprises, professional associations) are participating and are expected to participate at all critical levels of decision-making related to highway management. This is manifested, *inter alia*, by their inclusion and participation in road authorities, road boards and road funds where they exist in the seven countries studied. Such involvement clearly places the private stakeholders at the center of decision-making, which invariably involves decisions about road pricing policy and tariff setting, allocation of funds, prioritization of road maintenance expenditures, and road contracting. Such inclusion clearly demonstrates the governments' commitment to better manage their highway systems and expand the scope for market-based decision-making in highway management.

The institutional reforms advocated by the World Bank and SATCC under the framework of the RMI and SADC Transport Protocols have been adopted by many of the countries under study. These new institutional structures (i.e., road authority, road board and road fund) offer renewed promise to improve highway management in southern Africa. However, it is too early to determine the degree to which such institutions will be successful. As discussed below, there are a number of constraints that are likely to adversely affect how well these newly created highway management institutions perform. There is also some concern in countries such as Botswana, Zimbabwe and South Africa as to the wisdom of restructuring systems that presently appear to offer a relatively good level of service.

Effective execution of civil works, be it engineering supervision or actual works, in road maintenance and construction is another problem many road agencies face. However, there is no evidence that the latter is lacking in the current institutional arrangements for highway management in Botswana, Zimbabwe or South Africa. As such, restructuring road administration along the lines of the RMI approach at least in these countries poses the risk of disrupting systems that appear to be functioning with reasonable success.

3 9 1 Institutional Framework

Although most of the countries studied have begun the process of restructuring their road administrations to achieve more effective highway management, the exact roles, responsibilities and authority of these institutions have yet to be fully rationalized. Perhaps, the foremost institutional challenge facing these countries is the adoption and implementation of legislation creating road authorities, which continues to linger in many countries. While the road authority is not a panacea, the delay in implementing such institutions contributes to the already confusing and often conflicting picture of who is doing what, when and why.

3 9 2 Policy and Financial Constraints

The main policy and financial constraints relate to cost recovery from road users. This is a major problem for many of the countries studied. It relates primarily to the inability of the countries to properly price their highway infrastructure on the basis of road use and, thereby, cost their road network maintenance requirements. A good deal of work has already been directed at such an effort. A combined effort by SATCC/TU and COMESA to establish harmonized methods and procedures for estimating road user costs for the southern African region should not go unnoticed. This joint effort led to two approaches for road pricing. One approach was to consider marginal cost pricing for road pricing. The other approach suggested the use of a full cost recovery approach. Both approaches were presented at a workshop to representatives of the region's Ministries of Transport and are presently under consideration.⁷

Further compounding the problem is the inability of the countries studied to finance their maintenance budget shortfall without external assistance. A number of problems may account for this difficulty. One relates directly to road pricing, as the revenues derived from road user charges may not be calculated at a level high enough to meet the road maintenance needs. Additionally, the vehicle fleet may not be large enough to generate sufficient road user charges receipts for road maintenance. Finally, the more likely scenario is that all receipts derived from road users are not fully allocated for road maintenance purposes.

Allocation procedures of maintenance investment funds for different classes of roads also compound the problem of better highway management. This is especially evident in most of the countries studied where there is a lack of use or the non-existence of a fully integrated and operational highway management information system and decision-support system (HMS). Such an HMS system would enable highway authorities to better prioritize, program and budget for future road maintenance requirements. Unless a system to allocate financial resource based on objective economic and engineering criteria is established and controlled by the relevant highway management agency, political and social criteria are likely to continue to overly influence resource allocation and decision-making.

3 9 3 Administrative Constraints

Even in circumstances where countries have adequate pricing policies, revenue collection and remittance procedures for user charges often have frustrated the National Road Boards and Road Funds. This has, in part, been attributed to the fact that the mechanisms for collecting user charges often are not under the control of either the Road Fund or the Road Board. Rather, collections are more often than not under the control of either the Customs Department, if they include transit permits, the Ministry of Finance, if it includes a fuel levy on petroleum products, or the Road Traffic Department of the Ministry of Transport, if they include vehicle licenses, permits, and other user fees. In none of the countries studied were all receipts from user charges collected by either a Road Fund or a Board.

3 9 4 Technical and Managerial Capacity Constraints

With the restructuring of highway management that has begun in most of the countries under study, the technical and managerial capacity of the highway authorities to effectively supervise the expected volume of civil work is doubtful. Mozambique, Tanzania and Zambia are especially affected by this constraint.

⁷ Note: For a fuller discussion of cost recovery and related issues the reader is directed to Chapter 7 Cost Recovery.

Most of the countries anticipate that the private sector will play a more active role in engineering design services and road maintenance. By contrast, the public sector will assume more of a supervision and inspection or project management role. This being the case, the relevant highway authorities will have to either train or recruit more engineers and other technical staff to achieve a highway management system. Countries such as Botswana, Mozambique, and Zambia are taking steps to improve their technical and managerial capacity through training programs. Though concerned, other countries do not appear to be fully appreciative of or acting upon the extent of the problem.

3.9.5 Construction Industry Capacity Constraints

Assuming all of the structural problems discussed above can be overcome by the highway authorities, the question of whether sufficient domestic industry construction capacity exists in such countries as Malawi, Mozambique, Tanzania and Zambia is problematic. Further compounding this problem is the quality of work produced by existing road contractors. In most of the countries studied, including Botswana, Malawi, Mozambique, Tanzania and Zambia, poor civil works quality and the lack of private industry capacity exists both in the areas of consulting engineering services for design and supervision of road work, as well as for civil works for road maintenance, and in some cases road rehabilitation. Only highway contractors and construction engineering firms in Botswana, South Africa and Zimbabwe appear to have adequate construction industry capacity to meet the near-term volume of civil works planned in their respective countries. These companies in some cases have capacity to work elsewhere in the region. Any major road rehabilitation and construction in other countries is likely to be subject to international tender and, as such, is likely to be unaffected by the lack of local capacity.

CHAPTER 4 LEGAL AND REGULATORY FRAMEWORK

4.1 Introduction

Corresponding to the institutional reforms taking place in highway management in southern Africa, several changes are occurring in the legal and regulatory frameworks that govern the road sector. This is not surprising because, in practically all instances, to effect the required institutional changes necessary for highway management, the legal and regulatory frameworks also needed reforming. These legal and regulatory frameworks were, for the most part, formulated during the colonial era, an era when statist institutions, such as parastatals and large transport ministries, were the order of the day. Typically, such institutions had centralized, top-down management structures and relied mainly on force account methods for road maintenance and construction. Today, successful highway management requires more dynamic, innovative and market-responsive institutional arrangements.

Information on the implementation status of SATCC Protocols, legislative and regulatory frameworks was collected following consultations with SATCC and field visits to selected SADC member countries. Other information was derived from the EU-funded Transport and Communications Integration Study for Southern Africa. SATCC's legal and regulatory advisor to the USAID-funded STEP/PAAS project has drafted model legislation for the implementation of a Roads Board, Roads Agency and Road Fund in SADC member states. This model legislation is based on precepts in the World Bank's/ECA Road Management Initiative. Since the adoption of the Protocols in 1996 by member states, eight countries have ratified the Transport Protocols and full ratification is still pending in four of the twelve original SADC member countries. The Protocols are now in force.

This chapter examines the legal and regulatory frameworks governing the road sector in the countries under study. The chapter seeks to identify the reforms that form the legal basis to restructure the highway management institutions in southern Africa, as well as those countries contemplating future reforms. The following issues are of special interest: (1) the extent to which legislation has and can be harmonized to support new institutional structures as proposed in the SADC Transport Protocols, (2) the extent of any legal and regulatory reforms that permit private sector participation in highway management, particularly as they relate to concessioning overload control systems and border posts management, institutional structures (i.e., road agencies, road boards and road funds) and road maintenance, and (3) any proposed legislation and regulatory reforms to further advance efforts to improve highway management.

It should be noted that the overload control laws in most of the countries under study are based on laws and regulations enacted by governments 30 to 40 years ago. Key provisions of many of these laws and regulations govern the following:

- Provision and government operation of fixed and portable weigh bridges at selected locations on the national road system,
- Appointment of a competent authority to operate weigh bridges and impose fines, as applicable and revoke operating license of repeat offenders, and
- Detention of overloaded vehicles and, in some cases, the removal of excess loads

Table 4 1 - Legal and Regulatory Issues in Highway Management

Country	Key Legal/ Regulatory Issues	Status of Legislative and Regulatory Issues
Botswana	1 Legal/Regulatory Reforms 2 Institutional Reforms	1 Present laws do not permit private sector participation in overload control management 2 Road Authority Road Board and Road Fund are under consideration Reforms will require revisions to Roads Traffic Act Public Roads Act and other legislation No specific legislation is pending An ongoing study will identify the types of reforms that will be needed
Malawi	Institutional Reforms	Recently passed legislation has created a Road Agency
Mozambique	1 Legal/Regulatory Reforms 2 Institutional Reforms	1 Revisions to the Road Act to consolidate dispersed road functions and activities 2 Establishment of a National Road Administration is under consideration
South Africa	Institutional Reforms	Legislation for a National Roads Agency was approved in 1997 and is expected to be fully implemented by mid-1998
Tanzania	Institutional Reforms	Restructuring of the Central and Regional Road Boards into a National Roads Board is under consideration
Zambia	Institutional Reforms	Recommendations for a fully autonomous Road Agency under a modified structure led by the National Roads Board is under consideration by Cabinet
Zimbabwe	1 Institutional Reforms 2 Legal / Regulatory Reforms	Commitment made by Ministry of Transport and Energy for a National Road Authority but action is still pending before Parliament

Primary Source *Transport and Communications Integration Study for Southern Africa* Draft Final Report Vol 2 1997

Presented below is the status of country-specific legislative and regulatory reforms that have either been enacted, proposed or are pending before Cabinet or legislative body of the seven countries reviewed in this report

4 2 Country Reports - Legislative and Regulatory Framework

4 2 1 Botswana

The legislative and regulatory framework for the road sector in Botswana is governed mainly by the Road Traffic Act enacted in 1975, the Public Roads Act of 1907, the Local Government Act and related Amendments, respectively. Each of these Acts specify various definitions, roles, functions and responsibilities for constructing and maintaining Botswana's national road network and performing traffic administrative and management functions. There are some 47 separate Acts that have a direct bearing on the road sector. Additionally, Statutory Instruments and related regulations, as derivations of the various Acts, are also pervasive. The multitude of the all-encompassing Acts and Statutes results in a number of often conflicting roles and responsibilities for highway management.

As Table 4 1 and the comments above indicate, some of Botswana's existing laws and regulations governing the roads sector are inconsistent with the 1996 SADC Protocols on Transport. These laws and regulations will also need revision to support the recommended changes in the institutional and funding framework. There are also existing recommendations and pending proposals from the Ministry of Transport to reform Botswana's legal and regulatory framework to conform with other SADC member states. The necessary reforms will be an important step in creating a new framework, but this step will only be taken once the institutional and financial reforms have been agreed.

4 2 1 1 Highway Management

Although the first phase of an on-going Institutional Study recommended changes in the legislative and regulatory framework to permit the establishment of a road board, road authority and a road fund, no legislation is currently pending to create such institutional structures.¹ This has resulted in uncertainty as to the future of the roads sector, particularly as it relates to proposed institutional reforms. The key recommendations proposed for reforming the legal and regulatory framework in the roads sector involve (1) establishing a Ministry, (2) creating a Road Board and Road Authority, (3) establishing a dedicated Road Fund, (4) changing the responsibilities, functions and powers of existing ministries that execute highway functions, (5) restructuring the highway responsibilities of the local authorities, and (6) ensuring transparency in human resources development and asset transferal.² Should the Cabinet adopt these recommendations and enact appropriate legislation, this would result in a significant shift in the way the highway sector is managed and financed in Botswana. Additionally, the roles, functions and responsibilities of existing road agencies will also be impacted. The tone of the recommendations is progressive, and it remains to be seen if the proposed new institutions and legal and regulatory frameworks will have the intended impact of increasing private stakeholder participation in the sector and improving service delivery.

¹ Idem, "Institutional Study of Botswana Road Agencies," Phase I Report prepared by Burrow Binne Botswana Ltd with J E Austin Associates and others, 1998

² Most of these recommendations, particularly those to create new institutions, will require, *inter alia* amending the Road Traffic Act, the Public Roads Act and the Finance and Audit Act

Existing laws in Botswana do not provide for private sector participation in road management. Private firms can, however, bid on construction engineering and consulting contracts and execute construction and maintenance works under the existing legal framework.

4.2.1.2 Overload Control

Current laws in Botswana do not permit the private sector to manage the axle-weight control program on a concessionary basis.

4.2.2 Malawi

Passage of the National Roads Authority Act in 1997 in Malawi established a legal basis for new institutional structures for highway management. This was a key milestone for the Malawian road sector. Both public and private stakeholders welcomed Government efforts to involve the private sector in improving road transport and highway management. The creation of a new Roads Authority is expected to increase significantly the emphasis on professional road management in construction and road maintenance. The Government has further expressed a renewed commitment to increase funding for road activities, such as routine and periodic maintenance, establishing and monitoring overload controls and the use of private contractors. These changes enabled private firms to become increasingly involved in the roads sector. In addition, these measures are in sharp contrast to the force account approach used by the Ministries of Works and Transport.

Some of the key highlights of the 1997 National Roads Authority Act, such as the creation of the road management institutions, are discussed below.

4.2.2.1 The National Roads Authority

The 1997 National Roads Authority Act created a National Roads Authority. The Act further provided for the National Roads Authority to (1) oversee the maintenance, rehabilitation and development of public roads and related activities, (2) authorize the raising of funds for the maintenance and rehabilitation of public roads, (3) advise the Ministers of Works, Local Government and Transport on roads activities, and (4) establish an annual national road program and oversee the overloading of vehicles on public roads.

4.2.2.2 The National Roads Board

The National Roads Authority Act also enabled the establishment of a National Roads Board. The Act provides for (1) Board members to be appointed by the Minister of Works, (2) the Board Chairman to be appointed by the Minister of Transport, (3) Board members composed of the Transport Operators Association, the Bus and Taxi Operators Association, the Tobacco and Tea Growers, local government, National Safety Council, National Construction Industry, and ex-officio members of government, they are required to meet a minimum of once every two months, and (4) the Board to be responsible for approving an annual road program.

4.2.2.3 The Roads Fund

The National Roads Authority Act also created a Road Fund which provides for (1) funding from user charges, primarily as a fuels tax, but it also includes road fees, overload fines and vehicle licenses, (2) funds shall be used on roads, initially for maintenance but later construction, and (3) heavy penalties for misuse of funds.

These legislative and institutional reforms are well within the scope, letter and spirit of the USAID-funded SADC Transport Protocols of 1996 concerning regional authorities, funding and enabling transport legislation. The National Roads Authority Act is consistent with regional harmonization and provides a clear legal basis and regulatory framework to improve highway management in Malawi.

4.2.2.4 Private Sector Involvement in Overload Control

Under the new legal framework, the private sector is allowed to own and operate weigh-stations on designated routes, such as in industrial sites from which the cargo originates.

4.2.3 Mozambique

The legal and regulatory framework which governs the road sector in Mozambique consists of a number of old and often conflicting laws and regulations. It is generally believed that many of these laws are not adequate to cover all aspects of operations in the road sector. And urgent actions are needed to consolidate the Road Act, whereby the legal definitions, and the rights and obligations of a road authority is better defined. To achieve this, the legislative and regulatory framework governing Mozambique's road sector institutions and activities needs to be revised and consolidated under a single Roads Act.

In addition, laws governing road traffic administration also require revisions to bring them in line with modern practices. Specifically, road traffic laws and enforcement procedures affecting vehicle registration, licenses, and roadworthiness need to be revised.

4.2.3.1 Overload Control

Existing legislation governing vehicle overload controls was enacted in the 1960s and 1970s. Currently, the legislation is weak and is being revised, particularly those laws granting overload control authority to the Traffic Police. Other revisions will affect the Ministry of Transport and Communications, the National Directorate of Roads and Bridges, as well as road users.

4.2.4 South Africa

South Africa's legislative history of the transport sector has undergone a number of the changes over the past several decades. The first National Roads Board in the region was established in 1935 under the National Roads Act (Act 42 of 1935). The legal and regulatory framework of the Act also provided for the establishment of a National Road Fund. Because of coordination problems between the National Roads Board and the provinces, South Africa promulgated the Transport Coordination Amendment Act of 1948. This Act established the National Transport Commission (NTC) and was aimed at improving coordination between the provinces and the NTC. This Act was the governing legal and regulatory framework for some twenty years before it was changed in 1971. In 1971 the National Roads Act (Act 54 of 1971) was enacted. The National Roads Act granted exclusive responsibility for planning, construction, and maintenance of national roads to the NTC as an independent road authority.

South Africa replaced the NTC in 1988 and reconstituted the South African Roads Board (SARB), formerly the National Roads Board, under the South African Roads Board Act of 1988 (Act 74 of 1988). The Act granted autonomy to the SARB. The Act further conferred powers previously held by the NTC to the SARB.

Additionally, in 1997, South Africa again revised its laws and regulations governing the road sector and reconstituted the National Road Board and the Road Fund, and further created a National Road Agency. The legislative and regulatory framework in South Africa is comprehensive enough to permit private sector involvement in managing overload control, concession of toll roads, road maintenance contracting and related highway management activities.

4 2 5 Tanzania

As indicated in Chapter 3, Tanzania shares its operational, particularly funding, responsibilities for highway management between a Central Roads Board and a Regional Roads Board. Both were established by the enabling legislation of the Highway Ordinance (1993) and an amendment to the Highway Ordinance (1969). The Central Roads Board operating out of the Road Department manages 80 percent of the road funds, with the Regional Roads Board managing the remaining 20 percent. A recent institutional study recommended the creation of a National Roads Management Agency to consolidate the functions of the Central Roads Board and the Regional Roads Board. This Agency would be governed by a National Roads Board. The National Roads Board would also exercise authority over a National Road Fund. A legal review determined that the existing fund does not operate on a fully legal basis, it was established through a parliamentary resolution and the legislation needs strengthening.

As the comments above indicate, Tanzania intends to establish the institutions along the lines suggested under the World Bank RMI framework and the SADC Transport Protocols. To achieve this, Tanzania would have to enact new road legislation or amend the existing Roads Act.

4 2 6 Zambia

Zambia's policy on road maintenance is set forth in the Roads and Road Traffic Act of 1969, the Local Government Act No. 22 of 1991 and the National Parks and Wildlife Act Cap 10 of 1991. In addition, Sections 41 and 42 Cap 766 provides for the Ministry of Communications and Transport to develop policy on road transport. As Zambia transitions to new highway management institutions, additional legislation will be required to (1) establish a road authority and centralize all top level management functions, (2) transfer overload control to the Road Board and permit concessioning of the overload control system, and (3) permit full cost recovery from users for the financing through additional user charges (i.e., transit permits, licenses and fees of highway management).

There are a number inherent weaknesses in Zambia's current legislative and regulatory framework. First, management of roads on a fee for service basis is not provided for in existing laws and regulations. Second, no clear legislation or regulations exist that rationalize highway management responsibilities or the authority and powers vested in the road agencies. Management functions and legal mandates are not provided for in the Roads and Road Traffic Act of 1969 and the Local Government Act No. 22 of 1991. Moreover, the existing legal and regulatory framework does not adequately provide for private stakeholder involvement in managing and financing Zambia's highway system. This would necessarily, inter alia, include concessioning of heavy vehicle weight management, concessioning of border posts facilities and operations, contracting collection of transit fees or coupons, and provisions for private toll roads.

4 2 7 Zimbabwe

Similar to Botswana, Zimbabwe lags behind other countries in the region in introducing legislative and regulatory reforms and institutional changes. This is not entirely surprising as both countries have adequately managed their highway networks. Although stresses may indeed be building in the system, Zimbabwe's current specific problem stems not so much from a lack of institutional capacity but from

insufficient resources to fund road maintenance. Nonetheless, at the urging of the World Bank and SATCC, Zimbabwe began to introduce policy and institutional reforms in the road sector in 1997. The Ministry of Transport and Energy has proposed the establishment of a Road Authority, a Road Board and a Road Fund along the lines suggested by Road Maintenance Initiative of the World Bank and the SADC Transport Protocols. These new institutional structures require the enactment of new legislation. Although legislation for a dedicated Roads Fund was introduced in Parliament late last year, the legislation is still pending and no action has been taken.

4.3 SADC Protocols on Transport and Communications

Overarching all of the country-specific legislation and regulations governing the roads sector are the SADC Protocols on Transport and Communications (SADC Protocols). The SADC Protocols were adopted in 1996 by the Council of Ministers of the original eleven member countries. The general objective of the Protocols is to

“establish transport systems which provide efficient, cost-effective and fully integrated infrastructure and operations, which best meet the needs of customers and promote economic and social development while being environmentally and economically sustainable.”

The specific objective for road infrastructure requires member states to

“ensure and sustain the development of an adequate road network in support of regional socio-economic growth by providing, maintaining, and improving all roads including primary secondary and tertiary and urban roads, including those segments which collectively constitute the RTRN.”

The Protocols further require member states to

- develop a harmonized regional road infrastructure policy,
- adopt a common definition of the RTRN and common route numbers, which shall serve as a basis for a coordinated plan for construction and development of roads of regional and continental importance which they intend to undertake within the framework of their national programs,
- establish autonomous accountable national roads authorities which are representative of the public sector and which have defined responsibilities,
- develop and implement cohesive and definitive road funding policies,
- implement harmonized cross-border road user charging systems which shall be regularly reviewed, improved and supplemented through improved research and data collection, and
- implement complementary, flexible, sustainable, affordable, appropriate and transparent national road management systems

The adoption of these Protocols clearly demonstrates that those SADC countries that have initiated legal and regulatory reforms have done so in a manner consistent with the World Bank RMI framework

4 4 SATCC Model Legislation

Under SATCC, through the STEP/PAAS project, model legislation is being developed focused on the implementation of Road Funds and Road Boards, and on private sector participation. This legislation is expected to provide a harmonized regional framework for BOO and BOT ventures as a means of attracting private sector investment in infrastructure. The model legislation is expected to be presented to the SATCC Transport Ministers in June 1998.³

4 5 Findings and Conclusions

The key legislative and regulatory constraints to improving highway management involve the lack of a clear definition of the roles, functions and responsibilities of the highway institutions. Such institutions need to be better rationalized in order to achieve economies in their operations and to permit a more rational basis to allocate limited financial resources and program road maintenance requirements. Road Funds have been established in Malawi, Mozambique, Tanzania and Zambia, while Botswana, South Africa and Zimbabwe have agreed to do so in principal or have legislation pending before parliament. However, many legal and regulatory issues remain to be resolved before these funds can become effective vehicles to finance highway maintenance in southern Africa. The key unresolved issues relate to (1) the level and type of user charges, (2) the collections and remittance procedures to the road fund, and (3) the allocation procedures for different classes of roads and different geographical areas.

Road Boards established in Malawi, Namibia, Tanzania, South Africa and Zambia are also constrained by the lack of adequate legislative and regulatory powers to assume complete control of managing the highway network. For example, one of the main causes of premature pavement deterioration is vehicle overloading, yet Road Boards do not control the system to deter overloading. In addition, both the source of financing and use and allocation of financial resources are often under the control of other agencies, thus making key decision-making vehicles inaccessible and rendering Roads Boards oftentimes ineffective.

Countries such as Malawi, South Africa and Zambia have enacted the necessary legislative framework to achieve a sustainable highway management system that offer broad scope for private sector involvement. However, many of the countries studied are still in the process of ratifying their legislation. For example, legislation to establish a Road Authority in Zambia is still in debate in cabinet, while Zimbabwe still has the establishment of both a road board and a road fund pending before parliament. In addition, legislation to rationalize the roles, functions and responsibilities of the road authorities, such as the establishment of a road board in Mozambique, is still pending. Legislative revisions to dedicate all road user charges to a road maintenance and development fund remain problematic in most of the countries studied. Apart from contract maintenance, few of the countries studied have the necessary legislative frameworks to permit BOO/BOT operations in civil works, tolls road development, concessioning of overload control systems and border posts, or concessioning of their highway management information systems. The model legislation being developed by SATCC may assist the SADC countries to place such frameworks in place.

³ The draft legislation was not available to the Consultant at the time of preparation of this report.

CHAPTER 5: HIGHWAY MANAGEMENT SYSTEMS

5 1 Introduction

Budgetary constraints and accelerating road surface deterioration in the seven countries under study and elsewhere in the region highlight the urgency of allocating public funds and other resources on the basis of economic efficiency. The inability of national governments to keep pace with their network's maintenance needs, or to resolve competing demands for road funds in a socially optimal manner, have led to calls by international financing agencies and donors to rationalize road management decision-making. Given the complexity of national road networks (road types, pavement surfaces, bridge types, different traffic levels), such decision-making can only be rationalized on the basis of a systems management approach that relies on sound economic and technical criteria. This is commonly referred to as a highway management systems approach.

Typically, an integrated highway management system consists of at least two main components, a highway information system and a decision support system. The highway information system collects, organizes and manages data and information. The decision-support systems include management applications to process data and enable informed decision-making about road network management.

5 1 1 The SATCC Group of Experts on Road Infrastructure

The SATCC Group of Experts on Road Infrastructure have developed a set of principles for the design and development of a Road Management System (RMS) for SADC member countries¹. These include the following:

- Affordable and appropriate to decision-making needs and scarce resources normally available within the administrative and institutional environment of a typical SADC agency,
- Applicable to widely differing institutional circumstances ranging from large to small road agencies with strong to weak institutional capabilities and funding,
- Appropriate for dense to sparse networks with very high to very low traffic volumes,
- Flexible for staged development and implementation to suit the changing needs of the road agency,
- Integral to day to day activities of the road agency and
- Sustainable with scarce and often transitory human resources

¹The words "Road Management System(s)" and "Highway Management System(s)" or their acronyms RMS and HMS respectively are used interchangeably throughout this study. The reader should not interpret this as a distinction or difference between the two in either system features or implementation for highway management.

5 1 2 Proposed HMS Features and Standards

The design features of the proposed RMS is an integrated, modular and scaleable computer-based network. The network is to rely on a central server to house common data elements linked to various decision-support systems. These include (1) a road planning system, (2) a pavement management system, (3) a materials information system, (4) a traffic information system, (5) a bridge management system, (6) a maintenance management system, (7) a general information and mapping system, and (8) an administrative and cost control system.

The SATCC Group of Experts further proposed a number of sub-system features and standards for an RMS. According to the Group of Experts, the RMS framework should include (1) highway information and mapping, (2) planning and policy development, (3) pavement management, (4) bridge and structure management, (5) capacity expansion, and (6) maintenance and project operations management.

To enable road agencies to optimize maintenance planning and programming, the Group of Experts adopted the World Bank's HDM-III model as their basic analytical tool. To ensure accurate results are obtained, calibration of the HDM-III model requires continuous updating and monitoring of road conditions and other inputs. Although no equipment specifications were proposed, the Group of Experts did propose a staffing plan. The minimum staffing and technical requirements for managing and operating a RMS include a senior highway engineer, two middle-level engineers, two computer technicians and a part-time systems analyst.

In practice, however, the adoption of the RMS approach, framework and implementation procedures proposed by the SATCC Group of Experts has been uneven among the seven countries studied. The following sections present the features and implementation status of HMS systems in the seven countries studied.

5 1 2 1 HMS System Features in Selected Countries

As Table 5 1 below reveals, only Botswana, South Africa and Zambia have the full complement of HMS system features recommended by SATCC. HMS systems in other countries, such as Mozambique, Tanzania and Zimbabwe, still lack full deployment. Malawi does not have an HMS system. Further details and description of HMS features are presented in individual country reports.

Table 5 1 - HMS System Features in Use in Selected Countries

Country	Road Planning System	PMS	Materials Info. System	Traffic Info. System	Bridge Mgmt. System	GIS	Maint. Mgmt. System
Botswana	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Malawi	-	-	-	-	-	-	-
Moz	Yes	Yes	No	No	Yes	No	Yes
South Africa	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tanzania	Yes	Yes	No	Yes	No	No	Yes
Zambia	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Zimbabwe	Yes	Yes	No	Yes	Yes	No	Yes

Source Field Interviews March 1998

5 2 Country Reports - Highway Management Systems

5 2 1 Botswana

The Department of Roads has an operational management system for the primary and secondary road network. Both structural and visual information is collected. The Highway Design and Maintenance Standards Model (HDM-III) is being used as one of the primary analytical tools. The Expenditure and

Budgeting Model module of the HDM-III model, when implemented, can calculate annual funding needs². A standard on the performance index criteria is used to decide funding requirements.

The Botswana Road Management System (BRMS) consists of the following Modules: Central Core Database, Survey, Planning, Traffic, Mapping, a Pavement Management System and Diton's Total Information Management System (DTIMS). Currently, accident data and road sign information are not part of the system.

For the collection of field data, the Roads Department typically engages consultants. Data was last collected in 1996, and will be collected again this year. For the analysis of data, the SATCC system (already being implemented in Botswana) uses HDM-III. Diton's Total Information Management System (DTIMS) is used to facilitate the operation of the HDM-III program. The HDM-III program was calibrated around 1995/96 in Botswana using a number of test sections. The issue of calibration should be given priority if the program is to be of benefit in the region.

5.2.2 Malawi

Malawi does not have an HMS to manage its highway network. To achieve good road management, both the Government and the private sector must participate. The private sector is more equipped to handle road inspections and data analyses. The major constraint to improving road management is the limited capacity of road agencies. There is often insufficient or unreliable data collected to inform decision-making on highway management. Thus, the available road network assets and their conditions are not known.

The idea of having a centralized national road network database is worthy of consideration. The task of collecting data on a regular basis in the region can be contracted out to private firms. Road surface data as inputs for the HDM-III specifications can be collected at relatively high speeds.

USAID/Malawi is currently reviewing a proposal to provide technical assistance to the Ministry of Transport. The expectations are that an HMS system could result from this effort.

5.2.3 Mozambique

The HMS system for Mozambique was an outgrowth of the World Bank-led Second Roads and Coastal Shipping Project (ROCS II) in 1994. Under ROCS II, actions to improve highway management included implementation of (1) detailed planning and resource management, (2) a maintenance management system, (3) a road and bridge inventory, (4) a comprehensive road management information system, (5) a project management system, (6) integrated transport planning, (7) a road programming system, and (8) the capability to evaluate the environmental impact of road development and prepare remedial actions. After almost four years of project implementation of ROCS II, the HMS for Mozambique still lacks full

² The Highway Design and Maintenance Standards module developed by the World Bank, commonly referred to as the HDM-III model, simulates total life cycle conditions and road costs. The module systematically generates economic decision criteria for multiple road designs and maintenance alternatives for a single road or a group of roads. HDM-III incorporates vehicle operating costs, travel time costs, cost of construction, delays, congestion, road accidents, and environmental impact cost. The HDM-III also includes an expenditure and maintenance budget module which enables decision makers to prioritize and program maintenance for entire road networks.

development and skilled operators The main operational feature of Mozambique's HMS system is the HDM-III model

5 2 4 South Africa

Although South Africa has made tremendous strides through research and implementation in the area of pavement management, a fully integrated system for highway management remains illusive Not only should the HMS address, as it now does, planning, design construction and road maintenance in an integrated framework, it should also facilitate interaction between the executive and legislative authorities Presently, the HMS provides solutions to real problems facing decision-makers And as such, it is vulnerable to political, organizational, procedural and other technical predilections Additionally, the HMS provides decision-support for management decision-making, including such functions as policy making, strategic planning, financing, monitoring and control

The decision-support component of the HMS is supported by a highway management information system The highway management information system consists of established procedures for generating and evaluating alternatives for operating, maintaining, improving and developing South Africa's road network It provides information on road surface conditions, traffic volumes and loadings, as well as the impact of management decision making Such decision making includes (1) routine, periodic and special maintenance, (2) rehabilitation and reconstruction of road and bridges, (3) improving road geometrics and road capacity, (4) road network expansion, and (6) road pricing

South Africa's highway management information system provides the basis for resource allocation that is consistent with overall road surface conditions and desirable levels of service

5 2 5 Tanzania

The Tanzanian road network consists of approximately 88,000 km of Trunk, Regional, District and Urban roads Trunk roads are inter-regional (20 regions) and international There are about 10,000 km of trunk roads, of which approximately 3,200 km are paved It is the Trunk roads which are of most interest for this study

At present, the majority of Tanzania's road activities are managed by the Ministry of Works The largest on-going road activity in Tanzania is implementation of the Integrated Roads Project This US\$1.5 billion program is currently in year eight of a ten-year effort Phase I of this effort was designed to rehabilitate or upgrade some 2,400 km of trunk/regional roads and 1,500 km of core rural roads The goal for mid-1996 was to have 70 percent of the Trunk roads upgraded and 30 percent of the regional roads upgraded The mid-2000 target is 80 percent of the trunk roads and 50 percent of the regional roads The IRP II goal is to upgrade, improve or provide maintenance to more than 5,600 km This has been a significant undertaking as many of the roads reconstructed early in the program are already beginning to fail due to a lack of maintenance

Although the majority of the US\$1.5 billion obligated and/or committed in the Integrated Road Programs (IRP) thus far has gone to renovation of the trunk road network, a significant amount has also been expended on renovating rural roads (a successful USAID initiative) as well as funding road related training, road related studies and the establishment of a Management Action Group (MAG) located in the Ministry of Works

The MAG Unit has focused its efforts in four categories human resource development, institutional reform, system management initiatives, and commercialization. The MAG unit led the effort to identify and classify the road network into Trunk, Regional and District Roads. MAG has established a road inventory and condition database under the Road Mentor framework. Utilizing financial and technical support of the IRP donors, including USAID, the MAG group has initiated efforts to develop a road management system, a bridge management system, a contract monitoring system, a pavement management system and other road management activities. While some of these initiatives have languished, Tanzania appears to be ahead of many of the other SADC countries in establishing road management systems and data collection. In Tanzania, basic road data has been collected in the following categories (1) traffic surveys and axle load data, (2) pavement deflection data, rutting measurements, cracking measurements, patching measurements and loss of shape measurements on certain routes, and (3) sufficient economic data to, on a selected basis, conduct economic analysis by the use of the HDM-III and RTIM2 models.

5.2.6 Zambia

5.2.6.1 Highway Management System

Zambia's HMS has been in operation since 1994. The Ministry of Works and Supplies is responsible for managing the HMS and providing reports on highway maintenance priorities and budgeting to the National Roads Board. Installation of the HMS started under an agreement between the MOWS and the Danish Road Directorate by the Danish consulting firm Carl Bro International. The scope of the HMS included implementation of a highway information system, road, bridge, maintenance management applications and the establishment of procedures for data collection. The agreement also provided for training of local staff of MOWS' Roads Department in the operation of the HMS plus the incorporation of least 8,000 kilometers of roads into the system. The HMS is headquartered at the Roads Department in the Ministry of Works and Supplies in Lusaka. The system is manned by a Senior Engineer and two engineering assistants. Only two of Zambia's nine provincial districts, Lusaka and Ndola, have fully installed and operational HMS capabilities.

5.2.6.2 HMS System Features and Implementation

The HMS in the Roads Department has two main modules, Highway Information System (HIS) and Road Bridge and Maintenance Management Applications. The HIS is a system for identifying, collecting, storing, retrieving, and managing all data relating to highways. It provides all data necessary for planning, management and operation of a road network. The Road, Bridge and Maintenance Management Applications data base module includes a mapping reference function and management applications that include network planning, road and bridge data, traffic data, and maintenance management data, such as unit cost data, quantities and forecasts. Zambia's HMS also includes calibration of the HDM-III model and was completed in 1996 by a team of consultants.

The HMS system in Zambia is implemented on approximately 50 percent of the road network managed by MOWS, or, about 11,000 kilometers of roads. The output generated by the HMS is used by the National Roads Board as a tool to assist in programming road maintenance priorities and to allocate maintenance funds to MOWS and the Ministry of Local Government and Housing.

Lack of resources to conduct condition surveys, soils surveys, traffic surveys, procure additional computer and communications equipment, and purchase deflection measurement equipment has limited the effectiveness of Zambia's HMS. Additionally, the lack of trained staff in MOWS provincial districts has

also contributed to limiting the use of HMS to only 50 percent of the MOWS managed road network. To remedy this situation, the Roads Department has proposed a four-year Action Plan. This plan sets forth the key maintenance activities of the HMS for years 1998-2000. They include paved and unpaved road condition surveys, roughness measurements, traffic surveys, deflection surveys, test sections, and bridge and culvert surveys. The Action Plan also includes a budget for surveys and communications equipment and staff training. The total estimated cost of the HMS Action Plan is approximately US\$670,000.

Presumably, many of the financial and other problems now facing the HMS will disappear when the National Roads Board assumes control under the mandate of a new Roads Authority. Under such circumstances, the NRB would be expected to allocate sufficient resources for HMS to accomplish its mission.

5.2.7 Zimbabwe

To facilitate its operations, the Directorate of State Roads operates several maintenance management systems. These include (1) financial control, (2) pavement management, (3) road inventory, (4) road inspections, (5) bridge register and inspections, (6) culvert register and inspections, and (7) drainage. Each of these is operated by the staff of the Department of State Roads.

5.3 Regional Road Management Information System

SATCC/TU recognizes the need for accurate and current transport information to make informed policy and infrastructure decisions. Presently, SATCC obtains reports on the state of road transport at meetings every six months, a process that is too slow and often with incompatible formats to provide timely information. Limited resources in the past have adversely affected the ability to improve the situation. However, SATCC/TU now proposes the establishment of a Regional Road Management Information System (RRMIS) for the SADC region.

The main effort of SATCC/TU on Road Management Systems (RMS) is to encourage member states to harmonize their systems functions and data collection processes and inputs. Although it is used by many countries in the region, SATCC has not advocated using HDM-III as one of the main analytical tools for a RMS system.

5.3.1 RRMIS System Features and Implementation

SATCC has proposed to establish a Regional Road Management Information System (RRMIS). The RRMIS system is proposed as a real-time interactive network linking each member country to a central server. Each country will be able to upload their highway data including inputs for vehicle operating costs, traffic counts for different vehicle classes on different road surfaces at different speeds, road inventory (i.e., road geometrics, speeds, surface conditions), and road maintenance, construction costs, and funding sources. Countries will also be able to download summary tables and analytical reports of its own data, as well as summary comparison tables and analytical reports of other countries. SATCC provided a table detailing the type and frequency of data to be collected for RRMIS.

The Canadian International Development Agency (CIDA) is expected to finance the development of the RRMIS at a cost of C\$11.0 million. At present, the RRMIS is in the conceptual planning stage by the

STEP/PAAS project team³ The project is expected to be initially designed and detailed specifications prepared under the STEP project The RRMIS is expected to be operated by SATCC/TU on behalf of member states The design and implementation schedule for the RRMIS has yet to be determined by SATCC/TU No information is currently available on the input specifications or estimated cost of the RRMIS

Absent detailed specifications, the extent to which and how the RMIS will be implemented at the country level is unclear Because CIDA has agreed to fund the development of an RRMIS, the scope for USAID/RCSA involvement is limited Nonetheless, should USAID/RCSA desire to assist the SADC region to develop a Regional Highway Management System, opportunities are more likely to be available at the country-specific rather than regional level For example, countries such as Zambia, Mozambique and Malawi clearly require additional investments to achieve national road network coverage And, although the proposed Zambia Roads Authority is expected to take control of the HMS from the Road Department additional inputs are required to create a successful national HMS system

5.4 Findings and Conclusions

Except in a few countries, namely Botswana, Zambia, Zimbabwe and South Africa, the use and application of the HMS system has not been an effective tool for highway management decision-making by road authorities Efforts to establish HMS systems in Tanzania and Mozambique have not achieved the desired results and require additional institutional and financial support The present status of implementation of HMS systems is not promising The HMS system has not been successfully implemented in the region due to inadequate resources to conduct condition and other field surveys, lack of trained staff, and lack of computers and other equipment Finally, Malawi still lacks an HMS system

However, additional financial assistance from CIDA to SATCC/TU to establish a Regional Road Management Information System (RMIS) offers renewed promise The study team does not recommend any significant involvement by USAID/RCSA However, although efforts are underway to improve the region's highway management systems, particularly as they relate to highway management information systems, the definitions and standards for such MIS systems lack compatibility and transferability They are often confusing, contradictory and lacking in consistency and compatibility This situation provides an opportunity for USAID to support the development of an RMIS by funding complementary interventions As such, it is recommended that USAID fund the development of an Internet-Resident Roads Definition and Standards Manual (IRDS) For a fuller description of this recommendation, see Chapter 8

5.5 Recommendations

As noted above, it is recommended that USAID/RCSA undertake, in collaboration with SATCC/TU and COMESA, to develop an Internet-Resident Roads Definition and Standards Manual (IRDS) for use and

³ STEP/PAAS is an acronym for the USAID-funded SATCC Transport Efficiency Project/ Policy Analysis Assistance to SATCC project The project provides technical assistance for policy development and capacity building to the Southern African Transport and Communications Commission/Technical Unit based in Maputo

access by countries in the southern Africa region For a fuller description of this recommendation, see Chapter 8

CHAPTER 6

HEAVY VEHICLES WEIGHT MANAGEMENT SYSTEMS

6.1 Introduction

Highways in the SADC region have rapidly deteriorated over the last several years. The running surfaces, in particular, are rapidly wearing out, many of them far earlier than their anticipated design life. One of the causes of premature deterioration is repetitive heavy vehicle overloads and increased traffic, often much more than anticipated. This has occurred with truck traffic, the number of trucks using the roads has increased rapidly in response to the region's economic growth and an increasing demand for goods and services. However, the most serious contributor to this premature failure of pavements and running surfaces is the overloaded truck.

Although this problem was recognized, emphasized and given serious attention by public officials as early as 1991, with few exceptions, the problem is worse today. In many of the SADC countries, major highway rehabilitation programs are underway. However, due to vehicle overloading, deterioration of the road network, especially the regional trunk road network, is occurring at a faster pace than it is being maintained. If economic conditions within the region are to continue to improve, the deterioration especially the premature deterioration of the road network, must be urgently arrested.

In the SADC region, there are more than 560,000 km of system roads. The estimated value of these assets is greater than US\$50 billion. While no exact estimates exist on amount of damage done annually to road system by overloading, even a rough analysis will conclude that it is excessive. To reverse this cycle of premature road pavement deterioration due to overloading and inadequate road maintenance, strong public and private actions by stakeholders are required.

6.1.1 Heavy Vehicles Weight Management Systems Country Comparison

Presented below are country reports from the seven countries visited during the field studies to discuss managing heavy vehicles overload control. At the recently held Maputo Workshop on Vehicle Overload Control, twelve papers representing ten countries were presented on the impacts of vehicle loading. The information below was gathered in actual field meetings and from those papers presented at the SATCC workshop.

Table 6.1 below presents key characteristics of the prevailing Vehicle Weight Management systems in the seven countries under study.

Table 6 1 - Vehicle Weight Management Systems in Selected Countries

Country	Existing Weight Bridges	Planned Weight Bridges	Operating Authority	Protection	Unloading of Excess Loads	Abnormal Loading Regs.
Botswana	10 fixed, 6 portable		Roads Department		No	Yes
Malawi	58 fixed, 8 portable	14	Road Traffic Commissioner	Yes	Yes	
Moz	11 fixed	10 fixed, 10 portable	Traffic Police		Yes	
South Africa		125 fixed	NDOT	Yes	No	
Tanzania	10 fixed		Roads Department	Yes	No	Yes
Zambia	8 fixed,	10 fixed, 2 portable	Roads Department	No	Yes	Yes
Zimbabwe	13 fixed, 16 portable		Road Traffic Commissioner	Yes	Yes	Yes

Sources Control of Vehicle Overloading an Agenda for accountability and Private/Public Sector Partnership October 1997 selected Country Reports from the SATCC Workshop on Vehicle Overload Control February 1998

6 1 2 Vehicle Axle-Load and Gross Vehicle Mass Standards

Table 6 2 below presents the vehicle axle-load and Gross Vehicle Mass (GVM) standards in use in the countries under study The table reveals wide disparities among individual countries despite long-standing attempts to harmonize standards by regional institutions such as COMESA and SATCC Such disparities do not appear to be justified and may, as SATCC had observed, contribute to vehicle overloading by heavy goods vehicles Under the present regime, goods shipments could meet legal axle-load limits in one country and yet, in another, be in violation of the law(s) governing vehicle axle-loads

Table 6 2 - Axle Load Limits and Gross Vehicle Mass

Country	Steering	Drive Axle	Tandem (2)	Triple (2)	GVM
Botswana	8 0	8 2	16 4	24 6	52 2
Malawi	8 0	10 0	18 0	24 6	56
Mozambique	7 7	10 0	16 4	24 0	48
South Africa	9 2				
Tanzania	7 0	10 0	18 0	24 0	52 0
Zambia	7 7	10 0	16 3	23 0	63 25
Zimbabwe	8 0	8 2	10 0	16 0	56 0
COMESA Standards	8 0	10 0	16 0	24 0	53 0
SATCC Standards	7 7	10 0	17 0	24 0	50 0

Sources: Control of Vehicle Overloading: an Agenda for Accountability and Private/Public Sector Partnership, October 1997; Selected Country Reports from the SATCC Workshop on Vehicle Overload Control, February 1998; The SATCC Book of Road Traffic Model Statute, 1990, prepared by SATCC, pp 6, December 1997.

Separate country reports on vehicle weight management systems are presented below. These reports summarize the main features of the vehicle weight management systems in use, operations, the incidence rate of overloading and the causes of vehicle overloading, and identifies the actions necessary to better manage vehicle overloading.

6 2 Country Reports - Heavy Vehicles Weight Management

6 2 1 Botswana

Botswana has approximately 18,000 km of roads of which about 3700 are paved. The legal load limits are single axle-two tires of 7.7 tons, single axle-dual of 8.2 tons, and single axle-4 tires of 15.4 tons. A 1993 weigh-in-motion study indicated that about 11 percent of the trucks were overweight. Some estimates place the number today closer to 25 percent. Botswana has 10 permanent weighbridges and 3 portables. Current plans are to construct 3 additional permanent stations near the border. A pilot project using weigh-in-motion to collect axle loading is ongoing. Current laws in Botswana do not permit the private sector to manage the weight control program.

Management of heavy goods vehicle weight in Botswana is divided among three separate public agencies. The Roads Department is responsible for commissioning and managing weighbridges. The Police are responsible for collecting fines due to overload infractions. The Department of National Transport and Communications (DNTC) is responsible for issuing permits to transport operators. Because no one agency has full authority for vehicle overload control, cross-sharing of responsibilities tends to weaken the overall structure for heavy vehicles management. Funding for Botswana's heavy vehicles weight management system comes from general tax revenue. These funds are controlled by the Ministry of Finance and Development Planning.

Fines imposed by Botswana authorities for vehicle overloading are inadequate to recover the damage caused by heavy vehicles. Presently, Botswana has under consideration for adoption the fines schedule for vehicle overloading proposed by SATCC.

The adoption by the SADC countries of a 13-ton axle limit standard would seem to negatively impact Botswana, depending on what design axle load is used in their pavement design. This further highlights the need for harmonized axle-weight standards.

Current or planned efforts to improve heavy weight management in Botswana include (1) separation of enforcement and statistical operations, (2) provision of housing to weighbridge staff, (3) construction of two new weighbridges, (4) provision of uniforms to weighbridge staff, (5) electrification of weighbridge sites, (6) transfers of weighbridges to DNTC, (7) pilot privatization of three weighbridges, and (8) weigh-in-motion weighbridges.

6 2 2 Malawi

The Malawi road network consists of some 15,000 km of which about 2700 km are paved. Vehicle overloading is a major problem, some studies indicate 30-40 percent of trucks are overloaded in Malawi on any given day. Malawi currently has six weighbridges and is planning to install more. Malawi has a new Road Act, enacted in late 1997. Malawi also has a well-defined overload management system. Permissible vehicle weight limits are prescribed in the Road Traffic Act, with current axle limits being 10 tons. Malawi has adopted the proposed 1995 SATCC fee schedule for vehicle overloading penalties. The penalty schedule is based on a US\$6.00 base rate per 100 kg incremental. The fee schedule provides a progressive fee structure which allows for revision of the base rate so that the penalty remains an effective deterrent for both axle limits and Gross Vehicle Mass (GVM) overloads.

The main problem in Malawi, as it relates to vehicle weight management, is the lack of sufficient funds to operate the system. Malawian transport officials welcome private sector participation in a vehicle overload program. Executive officials of the Regional Road Freight Association in Malawi also expressed strong support for private stakeholder involvement in vehicle weight management during the field interviews.

6 2 2 1 Vehicle Overload Management System

A Vehicle Overload Management System (VOMS) has been installed in the Ministry of Works and the Department of Road Traffic. This VOMS system performs data capture and analysis functions. Expansion plans are underway to install the VOMS at all major weighbridges located at the border stations. The VOMS performs the following functions: (1) collects timely overloading data, (2) monitors effectively the extent of vehicle overloading, (3) identifies repeat overload offenders and corrective measure (i.e., permit revocation or operator's license), and (4) identifies unserviceable weighbridge equipment and repairs undertaken.

Malawi has also undertaken to involve the Road Transport Operators Association in organizing training seminars on vehicle overloading.

6 2 3 Mozambique

The Mozambique road network is 26,200 km of which 5000 km are paved. Many of the roads were designed to handle axle loads of 7.5 tons with a maximum load of 38 tons, while bridges were designed to carry 60 tons. These limits are far less than the suggested regional harmonization of 13 ton axle limits. It is anticipated that the proposed legislation will strengthen Mozambique's requirements.

In Mozambique, officials from Ministry of Interior (Traffic Police) are the operating authority for vehicle weight management. These officials are tasked with responsibilities to issue fines as applicable. Their authority is expected to be expanded to include vehicles inspections for roadworthiness and to prohibit the circulation of vehicle exceeding overload limits. Effective September 1998, all vehicles exceeding legal axle-load limits will have to unload the excess freight before being permitted to proceed. Mozambique has fifteen permanent weighbridges and ten portable units. Only ten of the fifteen permanent bridges have been installed, of these ten installed fixed weighbridges, two were destroyed during the civil strife, two are considered to be in reasonable condition and six are in good condition. Currently, weighbridges have been constructed at the main exit along roads from the ports and near bridges at the borders.

6 2 4 South Africa

The South African road network is approximately one half million km. This includes National roads (6,000 km), Provincial roads (51,000 km), Municipal, Urban and Rural roads. About 60,000 km of this network is paved. In 1995 only about nine percent of the national road network was classified as in good condition. This was substantially down from about 35 percent in 1985. Although vehicle weight control is given priority in South Africa, the country faces the same problems of overloaded heavy goods vehicles as other countries in the region. Current estimates indicate 15 to 20 percent of the heavy goods vehicles

are overloaded with some vehicles more than double their legal loads. And of some 58,900 heavy good vehicles weighed in 1995, 33 percent were overloaded.¹

South Africa estimates that overloaded vehicles cost the country approximately US\$110 million per year. To mitigate what was developing as a disastrous situation, the National Department of Transport along with provincial authorities in 1997 initiated a coordinated heavy vehicle weight control program. This program involves constructing and upgrading 125 traffic control centers countrywide. Consideration is ongoing to develop privately owned and operated traffic control centers which would include weighbridges. However, expansion of the national network of overload control centers is likely to be affected by the lack of finances. Because the current legal and regulatory frameworks governing overload control permit private management of traffic control centers, it is quite possible that private interests will play more of a leading role in developing overload control facilities. Presently, South Africa is considering proposals to manage traffic control centers from the private sector using a BOO/BOT approach.

6.2.5 Tanzania

The Tanzanian road network consists of approximately 88,000 km of which 10,000 are classified as trunk roads. Some 3,200 km of the trunk network are paved. Tanzania has eleven weighbridges in operation with another eight planned. The country has five portable units which are used to spot check overloads. Enforcement of truck weighing is lax. More than 25 percent of the trucks are overloaded and many of them grossly overweight. Many trucks simply don't stop and those that do are often fined but the fines are not collected. For example, in 1997, fines of more than 1.5 billion TSh (600 TSh = US\$1) were imposed with less than 40 percent of these fines collected. Tanzania is in the middle of a US\$1.5 billion road improvement program and a major increase in truck traffic is expected, since much of the truck traffic is international due to movements to and from the Port of Dar es Salaam, a program shared with neighboring countries would appear to be beneficial.

6.2.6 Zambia

The Zambian road network consists of 36,761 km of which 6,476 km are paved. This network was constructed mostly in the 1960's and designed with a 7-ton average axle weight. Consequently, the level of overloading and damage is quite high. Currently, eight weighbridges are in place with another ten electronic bridges expected to be installed soon. Zambia's ability to control overloading is affected by several major issues. First, the hours of operation are too short. Since most weigh stations are not open at night, many vehicles simply do not stop. Second, the enforcement procedures need strengthening. Finally, the decline in rail capacity has increased truck traffic. New legislation expected this year will permit private sector participation in vehicle weight control. The legislation is being promoted by the National Roads Board and the Ministry of Transport.

Zambia already has some experience with private sector involvement in managing heavy vehicle weight management systems. In 1993, Zambian vehicle weight management authorities and FEDHAUL collaborated on a trial basis to reduce the incidence of vehicle overloading. The results were both informative and positive. The FEDHAUL team observed that some vehicles were 40 to 50 tons over the legal weight limit over a 24-hour period. As a result, the mere presence of FEDHAUL representatives at the weighbridge inspection facility led to reductions in overloading.

¹ Cited in "Privatization of Vehicle Overload Control in Southern Africa" prepared by J. Bosman, paper delivered at the SATCC's Vehicle Overload Control Workshop, Maputo, February 1998, p. 2.

6 2 7 Zimbabwe

The Zimbabwe road system consists of more than 90,000 km of which approximately 12,000 km are paved. Many of these routes carry high levels of traffic with a high percentage of trucks. There are 19 weighbridge stations and considerable financial resources are expended to control overloads. Overloading has been decriminalized and offenses are handled outside of court. Introduction of a 24-hour surveillance system has decreased overloading from 46 percent before to 6 percent in 1996. Increasing overload fees has reduced overloading to 3.3 percent in 1997.

6 3 Incidence of Overloading

The impact of vehicle overloading on road pavements and bridge structures is well documented in the literature and is not treated in this report.² However, empirical studies conducted by the American Association of State Highway Officials (ASHO) on vehicle overloading, pavement and bridges reveal that the life of a road is approximately proportional to the third power of the axle load for the same number of passes.³ In other words, damage caused by repetitive overloading is exponential. This is a particularly burdensome problem in climates exacerbated by weather conditions such as the rainy season. This is known and applied worldwide as the ASHO road test, named for the American Association of State Highway Officials.⁴

Premature pavement failures, attributed to vehicle overloads at significantly early stages in the design life of the region's roads, impose unnecessary social costs. Such social costs are often for short-term and shortsighted financial gain. The incidence of vehicle overloading in southern Africa has reached alarming proportions. Vehicle overloading has accelerated the degradation of the region's highway network at a time when road agencies have entered a vicious cycle of road surface deterioration brought on by lack of maintenance and repetitive overloading.

Each of the countries visited during this study indicated they perceived truck overloading to be a moderate to major problem (i.e., 20-30 percent of trucks traveling their roads are overloaded). In those cases where trucks are actually weighed, however, the results indicate that about 25-40 percent of the trucks operating on the trunk routes have axle or gross loads in excess of statutory limits. A 1995 Burman report, prepared

² The American Association of State Highway Officials (ASHO) conducted tests in the late 1950s and early 1960s in which different pavement design on test loops were subjected to various truck loads to measure the effect on pavement wear. This test is commonly known as the ASHO road test and the results are widely applied worldwide in pavement designs.

³ As pointed out by Small, Winston and Evans (1989) in Road Work: A New Pricing & Investment Policy, the equivalence factor for an axle rises very steeply with load -- roughly as its third power. This was previously thought to rise to the fourth power and became known as the fourth-power law. For example, the rear axle of a typically 13 ton van causes 1,000 times more damage than a car. If legally loaded to 19 tons, it would cause at least 3 times more damage. Secondly, since it is the weight per axle that matters, not the total weight, a 50,000 lb two-axle dump truck causes more road wear than a twin trailer with seven axles.

⁴ More recent studies by researchers such as those by Small and Winston (1988) and Small and Zhang (1988) confirm similar results of the ASHO test. Pavement damage caused by repetitive heavy axle-loads results in shorter lifetimes for concrete pavements than what the ASHO test predicted. In other words, more recent studies suggest that damage due to heavy axle-loads is actually worse than previously studies found.

for the Federation of Regional Road Freight Associations, states that in East Africa an average of about 60 percent of the heavy trucks are grossly overloaded. The extra cost of these overloads in most countries exceeds their annual maintenance budget.

Although no systematic studies are available, knowledgeable analysts, public officials and transport operators estimate that in southern Africa between 11-50 percent of heavy vehicles are overloaded on any given day. COMESA estimates, based on reports from weighbridge stations, that 20-30 percent of heavy goods vehicle are overloaded and that about 60 percent of these are grossly overloaded. This problem is further compounded by the extent heavy vehicles exceed legal axle-load limits, particularly given the wide differences in prevailing axle-load standards among individual countries.

The cost of individual overloads cannot be precisely calculated, but it can be reasonably estimated. One way would be to use the American Association of State Highway and Transportation Officials (AASHTO) equivalency factors to estimate the effect of overloaded vehicles on pavement damage. These design equivalents indicate that a 12-ton single axle causes almost twice as much damage as a 10-ton axle, while a 14-ton axle causes about four times the damage as a 10-ton axle. Similarly, for tandem axles, a 20-ton axle is about twice as damaging as a 17-ton axle and a 24-ton axle about four times as damaging.

6.3.1 Enforcement

As Table 6.1 reveals, axle-weight control and enforcement is carried out by myriad of agencies and officials in the southern Africa region, ranging from the Traffic police in Mozambique and Botswana to officials from the Roads Commission in Malawi. These institutional arrangements complicate a regional approach at enforcement because of the various agencies involved. However, the most serious problem road authorities face are weak managerial capacity and the lack of trained officials to effectively manage, operate and maintain the weighbridges.

6.3.2 Sanctions and Penalties

By all accounts, the sanctions and penalties imposed on first-time and repeat offenders are inadequate to effectively deter vehicle overloading. Moreover, existing control measures involving specific sanctions and penalties are so varied thus rendering a regional approach impractical in the absence of a more rationalized system. Full details of the fines for vehicle overloading are presented in Annex C.

6.4 Regional Institutions and Heavy Vehicles Weight Management

The pernicious nature of vehicle overloading is one of the most urgent and compelling problems facing highway agencies in southern Africa. Regional institutions such as COMESA and SATCC have for many years recognized the threat posed by vehicle overloading and the resulting economic loss to individual member states and the region's economy. Recently, both organizations have intensified efforts to address the problem of vehicle overloading.

6.4.1 Preferential Trade Area

In late 1997, at the Fourth Meeting of the Ministers of Public Works, Transport and Communications of COMESA member states, the ministers agreed to harmonize institutional policies and measures for regional Vehicle Weight Management. The measures were further endorsed by the Eighteenth Meeting of the Council of Ministers who directed that heavy vehicle weight management systems be effected after member states introduce a fees-based system on a sliding scale. The Council of Ministers further agreed

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- Issuance of COMESA carriers license be conditioned upon observance of Road Traffic Laws and regulations, including axle-load limits,
 - Issuance of COMESA Axle-Load Certificates to be granted to institutions and or companies nominated by governments,
 - Issuance of COMESA Axle-Load Certificates only to valid COMESA licenses holders,
 - Loaded trucks lacking valid COMESA Axle-Load Certificates shall not be allowed to engage in inter- state haulage,
 - First and second-time offenders shall pay fines on a sliding scale basis and operators shall be banned for three years from engaging in inter-state transportation of goods, and
 - Member states shall exchange information on road transport operators violating axle-load limits through the COMESA Secretariat who shall prepare a register of transgressors, including banned haulers

Given the lack of effectiveness in controlling overloading by present institutional arrangements, COMESA has suggested the need for a self-regulating system that places the onus for controlling overloading on transport operators and freight forwarders. Moreover, it recommends that it be mandatory for operators to have a COMESA Axle-Load Certificate before commencing a journey.

According to the PTA, axle-load control systems not based on a regional framework result in duplication of investments as countries install their own weigh bridges at the border posts. Consequently, the most cost-effective approach is joint management and operations of weighbridges by countries sharing a common border, thereby reducing administrative costs for weighbridge operations. Such joint management should also yield significant travel time savings and, in turn, under competitive markets should place downward pressures on transport costs.

6.4.2 SATCC

In 1993, the SATCC Committee of Transport Ministers expressed its intention to harmonize axle limits for the region to 10 tons for a transitional period, after which axle limits would be increased to 13 tons. Earlier this year, SATCC held a workshop on vehicle weight management to review the work of its Special Working Group on vehicle weight management. Technical experts from ten SADC countries presented papers detailing the problem in their respective countries.

The SADC Protocols require that road users pay the full cost of maintaining the region's road network. Effective vehicle overload control is seen as a cost-minimization strategy. Differences in axle-weight limits are believed to contribute to overloading. While a truck might meet the legal standards in one country, as the vehicle crosses the border to another it could violate axle-load limits by as much as 22 percent. Eleven SADC member states have three different single axle-weight limits. Some SADC member states have adopted the 10-ton standards, others have adopted the 8.2 ton axle-weight limit, and South Africa alone has adopted the 9.0 ton axle-weight limit. SATCC believes vehicle overload can be controlled under the following conditions:

- Clear and sufficient legal authority for control,
- Authority is appropriately placed in the government,

95

- Effective and efficient procedures for overloading control are identified and adopted,
- Sufficient and reliable financial mechanism is in place to ensure the adopted heavy vehicles weight management procedures can be fully implemented,
- Enforcement staff of the overload control body are adequately trained in the adopted procedures, and
- Adequate monitoring mechanism is in place to ascertain the extent of overloading on a continuous basis

To address the problem of vehicle overloading, SATCC proposes a three-part initiative that includes (1) formation of a Vehicle Overloading Control Working Group, (2) hosting of a Vehicle Overload Control Workshop to initiate activities of the Working Group, and (3) a Memorandum of Understanding on Vehicle overloading for incorporation as an Annex in the SATCC Protocols

The main conclusions of the SATCC Workshop on Overload Control were the following

6 4 2 1 Causes of Overloading

Overloading remains a serious problem in the SADC region. The reasons cited are (1) criminal prosecution procedure hinders enforcement, (2) lack of coordinated efforts at the national and regional level, (3) ignorance and lack of appreciation in Finance and other Departments, (4) fines imposed are insufficient to control overloading, (5) controlling overload is not a priority, (6) lack of supervision of weighbridge operations, (7) delays in implementation of harmonized axle-load limits, and (8) the lack of an effective reporting system

6 4 2 2 Weighbridge Management

Overload control systems are often burdened with ineffective and inefficient weighbridge management. This is attributed to (1) lack of equipment, (2) shortage of skilled staff, (3) lack of motivation, (4) lack of supervision, (5) bribery and corruption, (6) lack of operator education and skills training, (7) and low remuneration for overload enforcement officers

6 4 2 3 Legal and Regulatory Framework

Controlling vehicle overloading in the SADC region also requires additional legislation and regulations in the areas of (1) axle-load limits and gross vehicle mass, (2) harmonization of axle-load tolerances, (3) control of hazardous substances, (4) decriminalization of infractions, (5) identification of and increased penalties for habitual offenders, and (6) regional adoption of legislation and regulations

6 4 2 4 Stakeholders Participation

Involvement of the trucking industry is to include such measures as (1) education on the effects of vehicle overloading, (2) elimination of habitual offenders, and (3) participation of industry representation on Road Boards

6 4 2 5 Corrective Actions to Control Overloading

Actions identified to control vehicle overloading include (1) improved supervision at the weighbridges, (2) provide incentives for weighbridge staff, (3) revise legislation to change fines to fees, (4) improve road network monitoring, (5) maintain existing weighbridge equipment, (6) improve training for enforcement officers, and (7) improve weighbridge operations

Repeated calls by regional institutions such as COMESA and SATCC to enact a harmonized system of laws and regulations for controlling overloading have not, on the whole, been successful. Although this is a result of many factors, the most compelling is the lack of political will by national governments. National governments appear not to be committed to controlling vehicle overloading, despite the fact that many governments have expressed their willingness and intentions to do so.

Although these are important steps to control overloading, the likely success and effectiveness of these measures are uncertain. For example, the role of private stakeholders such as transport operators and freight forwarders were circumspect, not fully explored or developed by the workshop participants, although some promising ideas were presented. To control overloading effectively, a more radical approach is required. An approach is needed that transforms the control of overloading from a government enterprise lacking in incentives to private involvement where a proper balance is achieved between incentives and disincentives.

6 5 Findings and Conclusions

As the country reports indicate, overloading is a serious problem throughout the SADC region. With many of the countries embarking on major road rehabilitation programs, it is paramount that overloading is controlled before the new roads are constructed. To do otherwise would simply be a waste of valuable construction dollars. Virtually every country reports that most of the road transport operators view overloading as a paying proposition. A coordinated effort between countries is urgently needed, and donors should make overloading a part of any conditionality involved with new financial assistance. Most of the countries have equipment to operate such a program but are lacking the financial resources. Most nations are willing to consider private sector involvement in vehicle weight management.

The vehicle weight management systems discussed above are generally ineffective as a deterrent to vehicle overloading on the region's road network. The main factors believed to account for this are (1) weak institutional and administrative practices, (2) inadequate funding for weighbridge equipment, (3) inadequate penalties/sanctions for overload infractions, (4) inadequate maintenance of weighbridge equipment, (5) lack of incentives to comply with overload laws by truck owners or freight forwarders responsible for the freight because present laws target the truck driver, (6) acceptance of bribes by overload control officers, and (7) lack of stakeholder involvement.

6 6 Recommendations

A model project in Heavy Vehicle Weight Management would appear to be an excellent and timely investment for USAID. With many of the countries having recently passed or considering passage of new legislation for establishment of Vehicle Weight Management programs, wide scope exists to assist these countries to implement the new legislation. As such, it is recommended that USAID fund a model program in Vehicle Weight Management.

The recommended approach is the issuance of an RFP inviting individual countries, private firms and institutions to partner and compete to build such a facility. Selection criteria could be based on the institutional arrangements, proposed level of public-private inputs, the proposed design concept and services offered. Strong consideration could be given to implementing this activity on a corridor basis involving two or more countries such as between Malawi and Tanzania and Zambia, or Malawi, Mozambique and Zimbabwe. The program should be managed and operated by private operators, and should be financed as a two-year program with the option for a third year, if successful. An evaluation would be done at the end of the first eighteen months. For a fuller description of this recommendation and related implementation approach and costs, see Chapter 8.

CHAPTER 7: COST RECOVERY SYSTEMS

7 1 Introduction

Transport economists generally believe the costs of pavement damage should be accounted for when pricing road use. Such costs typically represent (1) road maintenance costs incurred by the road administration responsible for maintaining the road, and (2) road user costs or those costs incurred by vehicle operators who use the road.

Road maintenance costs include (1) road administration costs (i.e., headquarters and field costs such as staff salaries, travel and related expenses, training expenses, and administrative overhead costs), (2) equipment plant and pool costs, (3) materials costs, and (4) labor costs. The cost of road maintenance is dependent upon pavement design standards (i.e., paved surfaces such as concrete, asphalt and unpaved surfaces such as gravel and earth), axle-loads and traffic loadings, particularly heavy vehicle traffic. The dominant element of such costs is the number of Equivalent Standard Axles (ESAs) ¹

Road user costs, more commonly referred to as road user charges, occur as a direct result of owning and operating a vehicle. Such charges represent both variable and fixed costs. Variable costs are directly dependent upon placing a vehicle into service or the cost associated with vehicle depreciation. Typically, variable costs include fuel and lubricants, tires and tubes, spare parts and maintenance costs. Conversely, fixed costs are those costs associated with vehicle ownership and include vehicle depreciation, insurance, taxes and fees, such as vehicle registration and licenses. From an economic perspective, road user charges should equal the costs of the resources consumed when using the road system (i.e., the short-run marginal costs should equal the marginal benefit received).

One of the most important conclusions of the World Bank's RMI is that "there is no clear price for roads, road expenditures are financed from general tax revenues, and the road agency is not subject to any rigorous market discipline." Moreover, it is argued that "roads are financed like social services" ² This is precisely the problem in southern Africa.

This chapter examines (1) road pricing, including tariff rates and structures, and (2) charging systems including charging instrument and collection system for road maintenance. The chapter also discusses such issues as road pricing and the methodology for estimating pavement damage and road use cost. It deals primarily with pricing and cost recovery policies, and inter-modal competition between road and rail.

¹ Road pavements are designed to withstand a certain number of passes of standard axle weights and configuration before requiring an overlay. The standard is a single axle of 18 000 pounds and damage imposed is defined in terms of the number of Equivalent Standard Axle (ESAs).

² "Managing and Financing of Roads: An Agenda for Reform" prepared by Ian G. Heggie, Technical Paper Number 275, World Bank, Washington, DC, pp. 70, 1995.

7 2 Road Pricing and Cost Recovery Systems

The basic ideas surrounding cost-recovery systems can be expressed as a series of interrelated questions. These include questions regarding how to determine and recover the cost of pavement damage, at what levels should road prices be set, how to allocate the costs among different road users, what charging or revenue generating instruments to use, who should collect the fees from road users, and should fees from road user charges be dedicated to specific institutional structures such as a road fund or a road board? Some of these questions are addressed in Chapter 3 on Institutional Structures. This Chapter addresses such questions as the charging instruments, road pricing policy and methodology for estimating pavement damage costs and responsibilities.

Table 7 1 on the following page summarizes the charging instruments for road user charges of the seven countries under study. Of all the charging instruments in use, the one most widely applied is the fuel levy. With the exception of South Africa and Zimbabwe, each of the five other countries imposes fuel levies to finance road maintenance.

Also revealing is the lack of a heavy vehicle license fee. These results are surprising in light of the fact that even though heavy vehicles are a small share of the total vehicle fleet in most countries, heavy vehicles cause the most pavement damage. As Table 7 1 reveals, only Zimbabwe imposes a heavy license vehicle fee. Although a number of countries such as Zambia and Tanzania are considering imposing a heavy vehicle license fee on road transport operators, it is uncertain if these proposals will finally be adopted.

Table 7 1 - Charging Instruments in Use in Selected Countries

Country	Dedicated to Road Fund	Fuel Levy (1)	License Fees (2)	Transit Fees (3)	Heavy Vehicle Fee (4)	Other Charges (5)
Botswana ³	N A	Yes	Yes	No	No	Penalties, inspections & ownerships fees
Malawi	Columns 1,2,3, & 4	Yes	Yes	Yes	Yes	--
Mozambique	Columns 1,2 &3	Yes	Yes	Yes	No	Bridge Tolls
South Africa	-	No	No	No	No	General Revenues
Tanzania	Columns 1,2,3, & 4	Yes	Yes	Yes	No	Vehicle Excise taxes, duties
Zambia	Columns 1,2 &3	Yes	Yes	Yes	No	-
Zimbabwe	N A	No	Yes	Yes	Yes	-

Sources Field Studies "Management and Financing of Roads" report prepared by I G Heggie World Bank Technical Paper 275 p 65 1995

NA=Not Applicable because country lacks a Road Fund but earmarks certain road user charges for road maintenance

³ Botswana does not have a dedicated road fund but collects a variety of charges from road users that go into the general revenues

7 3 Country Reports - Cost Recovery System

7 3 1 Botswana

Unlike most of the countries studied, revenues derived from road users in Botswana are allocated into general tax revenues and not into a dedicated Road Fund for road maintenance. This does not necessarily present a problem when the GDP is as high as that of Botswana. The country's ability to finance its road maintenance requirements through the budget process without external assistance is an exception in the region. Thus, the need to recover road costs, prioritize and allocate financial resources through a dedicated institutional structure is questionable in terms of availability of financial resources to the road system, but clearer in terms of establishing direct signals and economic incentives to users and stakeholders.

7 3 1 1 Road Tariff and Structure

Because Botswana does not have a Road Fund, it does not have a specific road tariff or charging instrument dedicated exclusively to road maintenance and rehabilitation. However, Botswana does have a clear road pricing policy. The road pricing policy is based on the principle of full cost recovery. It seeks to recover from all beneficiaries an increasing proportion of the cost of providing and maintaining transport infrastructure. This policy is intended to ensure the availability of future road maintenance funds. A user charge study is planned for 1998, and its recommendations should be implemented along with the planned Road Fund. In the future, Botswana will commercialize some services on a fee-for-service basis.

7 3 1 2 Charging Instruments and Collection System

As indicated above, Botswana does not earmark or dedicate revenues derived from road user charges to a special fund or account for road maintenance and rehabilitation. Instead, revenues from user charges (i.e., duties and excise taxes, licenses and permit fees, and penalties charged to road users) go directly into the general tax revenues. Resources necessary to finance road maintenance are allocated through the national budgetary process. In 1996/97, the consolidated revenues derived from road user charges amounted to P49.6 million Pula (US\$13.55 million).

7 3 2 Malawi

Although recently enacted legislation under the National Roads Authority Act of 1997 provides for one, Malawi has not yet established a fully operational Road Fund to which dedicated user charges are transferred. This complicates the country's ability in the short run to adequately maintain its road system. However, when the Fund is fully operational, revenues derived from fuel taxes will be used to capitalize the fund.

7 3 2 1 Road Tariff and Structure

The road tariff to be applied to road users for road maintenance and later road construction consists primarily of a dedicated fuel tax. Other user charges to be applied include road fees, overload fines, and vehicle licenses. The initial fuel tax to finance road maintenance has been established at US\$0.04 per litre of fuel.

7 3 2 2 Charging Instrument and Collection System

As indicated above, the main charging instrument authorized under the newly enacted Roads Authority Act of 1997 to finance road maintenance is the fuel levy. In addition to the fuel levy, other charging instruments such as road fees, overload fines, and vehicle licenses will also be dedicated to the Road Fund. During FY98, some US\$11.0 million are expected to be realized for the Road Fund. By FY98, the Fund is estimated to reach some US\$13.6 million.

7 3 3 Mozambique

Mozambique's cost recovery system relies on three charges imposed on road users. These include a bridge toll, a fuel levy and transit fees. Although substantial revenues are collected annually, the level of charges are unrelated to the cost of road use or road maintenance costs.

7 3 3 1 Road Tariff and Structure

Mozambique lacks, at present, an articulated road pricing policy to enable its Road Fund to recover the full cost of maintaining its road network from road users. The government has agreed to finance road maintenance from three dedicated charges imposed on road users. These include a fuel levy, bridge tolls and an international transit fee. Of the three charging instruments employed in Mozambique, the main instrument in use is the fuel levy. The fuel levy is applied to three types of petroleum products. It is set at US\$0.18 per litre for premium gasoline, US\$0.12 for regular and US\$0.04 for diesel. The fuel levy is set by the Ministry of Industry and the Price Commission.

7 3 3 2 Charging Instruments and Collection System

The charging instruments used to generate revenues to finance road maintenance and rehabilitation in Mozambique include (1) a fuel levy, (2) international transit fees, and (3) bridge tolls. The fuel levy accounts for 80 percent of revenues derived from road user charges. Transit fees account for between 9-10 percent and bridge tolls about 1 percent.

The Customs Department collects the fuel levy on behalf of the Ministry of Finance and deposits the receipts into accounts of the Ministry. The Ministry of Finance then releases the funds to the Road Fund. ECMEP (the parastatal road construction agency) collects the bridge tolls under a contract with DNEP and deposits the receipts into bank accounts of the Ministry of Finance. The Customs Department collects all receipts from transit fees based on a coupon system and then transfers the funds to the Ministry of Finance accounts. Mozambique is considering contracting out the collection of international transit fees to a commercial bank. Total annual receipts from all sources in 1995 were US\$6.3 million. An independent audit is performed annually.

7 3 4 South Africa

Contributions to South Africa's General Revenue Fund from what are typically road user charges, including the fuel levy, licenses and permits, and registration fees, are not dedicated for the exclusive use of road authorities for road maintenance and construction. Road users also contribute to general revenues through value added taxes or VAT. However, unlike other southern Africa countries, South Africa does not earmark road user charges to its Road Fund. Instead, revenues used to finance South Africa's road maintenance and development program are appropriated through the regular budgetary process from the

General Revenue Fund

7 3 4 1 Road Tariff and Structure

As indicated above, South Africa does not, at present, use a fuel levy to finance road maintenance and development. However, existing legislative proposals are to reestablish the Road Fund and dedicated fuel levies to the Road Fund. The proposed tariff rate structure is to charge US\$0.01 per liter on fuel. It is expected that the fuel levy will become effective sometime in 1998, fully ten years after it was abandoned as a means to raise revenue for road maintenance.

7 3 4 2 Charging Instruments and Collection System

Even though the National Roads Act of 1988 provides for a fuel levy as the charging instrument to fund road maintenance, this instrument has not been in effect by the South African road authorities since 1988. Until 1988, payment of the fuel levy was made by petroleum companies and deposited directly into accounts of the Road Fund. The Ministry of Finance terminated this arrangement in 1988 because the Road Fund was accruing large surpluses at the end of each fiscal year. Presently, South Africa does not dedicate road user charges to its Road Fund. However, there is a legislative proposal to reintroduce a fuel levy.

South Africa introduced toll roads as part of its national road system in the mid-1980s on heavy traffic roads. Tolls were imposed as means to finance road maintenance and development on a self-sustaining basis.

7 3 5 Tanzania

Although Tanzania has instituted a cost recovery system to meet its road maintenance needs, shortfalls remain and the country continues to require external assistance. A key reason for this is that the level of the road tariff and the type of charges are not set high enough for full cost recovery.

7 3 5 1 Road Tariff and Structure

The road pricing policy in Tanzania is based on the principle that all road users, including government vehicles, should pay the fuel levy. Initially, the road toll, or more precisely fuel tax, was set at 7 Tsh per liter. In 1994/95, this was raised to 50 Tsh/liter. And at present, it has been increased to 70 Tsh/liter. Considering inflation, these increases have still been more than threefold in real terms. Despite these increases, the revenue generated from the fuel levy is not sufficient to fund road maintenance.

7 3 5 2 Charging Instruments and Collection System

The fuel levy is the most important source of revenues to finance road maintenance in Tanzania. It accounts for some 80 percent of the total revenues. The fuel levy is set at US\$0.06 per litre for gasoline and diesel fuel. The fuel levy is set by the Ministry of Finance based on advice from the Central Roads Board. The remaining 20 percent of the revenues come from general tax revenues derived from duties and excise taxes on vehicles and spare parts. These remaining funds are not released to the Central Road Board but are instead deposited into a Road Fund controlled by the Prime Minister's office. Tanzania is also considering imposing a heavy vehicle license fee to expand its revenue base for road maintenance.

The fuel levy is collected by the Customs Department on behalf of the Ministry of Finance. Annual receipts in 1995 were US\$21.5 million. An annual audit is conducted by the Tanzania Audit Corporation, a parastatal agency.

7.3.6 Zambia

Zambia has a well-established system of cost recovery for road use and road maintenance. However, the revenues derived from road users are not set at a level to recover the full road use cost. Like the other countries studied, Zambia continues to experience annual shortfalls in meeting its maintenance requirements.

7.3.6.1 Road Tariff and Structure

The main charge imposed on road users for road maintenance and rehabilitation in Zambia is a fuel levy, or more precisely, a fuel tax and levy. The fuel levy is periodically adjusted to account for inflation. In 1995, the fuel levy was 40 Kwacha, or, about US\$0.08. And as of June 1997, the fuel levy was charged as a percentage (1.5 percent) of the wholesale price on both petrol and automotive diesel fuel.

7.3.6.2 Charging Instrument and Collection System

As noted above, the source of revenues to finance road maintenance in Zambia is the fuel levy. The fuel levy is set at 40 Kwacha (US\$0.08) per litre for gasoline and diesel. This levy accrues to the Road Fund which is administered by the National Roads Board. The level of the fuel levy is established by the Ministry of Finance and Economic Development and is charged as a percentage of the wholesale price of gasoline and diesel fuel. The fuel levy is reviewed annually to determine if it requires any adjustment.

The Ministry of Finance and Economic Development collects the fuel levy from the oil marketing companies. The Zambia National Oil Company (ZNOC) deposits proceeds from the fuel levy into accounts controlled by the Ministry of Finance and Economic Development. These funds are released to the Road Fund every ten days.

The fuel levy generates about US\$12 million per year. However, the amount of revenues derived from the fuel levy are not sufficient to meet Zambia's road maintenance requirements. In view of this, the Government is considering broadening the revenue base to include transit tolls, weigh bridge fees, tolls and fines and road licenses. Zambia is also considering imposing a heavy vehicle license fee.

7.3.7 Zimbabwe

A specific institutional structure such as a Road Board or Road Fund to manage dedicated receipts derived from road user charges and to finance road maintenance does not exist in Zimbabwe. Instead, these functions are the responsibility of the Ministry of Transport and Energy operating through its Roads Department.

7.3.7.1 Road Tariff and Structure

As indicated in the note to Table 7.1, Zimbabwe does not as yet have a Road Fund to which specific road user charges are dedicated. However, unlike other countries in this study, Zimbabwe does impose a special fee on heavy goods vehicles.

7.3.7.2 Charging Instrument and Collection System

The main charging instrument used in Zimbabwe for damage caused by heavy goods vehicles is the heavy vehicle fee. Because Zimbabwe does not, as yet, have a Road Fund, even though legislation is pending before parliament to create one, receipts from road user charges are not dedicated to a Road Fund. Receipts from taxes on petroleum products, excise taxes and duties on vehicle and spare parts, licenses, permits and fees go into the general tax revenues.

7.4 Road Pricing Policies and Estimation Methods

Regional institutions, such as SATCC and COMESA, have taken the lead in advocating a clear road pricing policy based on sound economic principles and a standard methodology and procedures for estimating charges for road use. In 1992, the PTA⁴ and SATCC commissioned a joint study to (1) establish a common methodology and principles for calculating charges, (2) determine the levels of common charges to be levied, (3) formulate a uniform system for charging and collection of revenues, and (4) propose the use and management of revenues collected from road transit charges. This study was to form the basis for a harmonized road pricing policy and a standard methodology for estimating the cost of road use and the corresponding road pavement damage.

7.4.1 SATCC

The road pricing principles enunciated by SATCC and adopted by the Council Ministers as the basis for harmonizing road user charges by member states include the following:

- charges on foreign vehicles shall cover that part of road maintenance which can be ascribed directly to the passing of the foreign vehicles, and
- charges levied on individual vehicles shall be based on the number of standard axles (ESA) the vehicle represents when crossing the border and distance to be covered within the country
- These charges compensate member countries for road wear costs attributable to road use by foreign vehicles. SATCC's road pricing policy, as the above implies, is that the costs used for deriving the road user charges for a foreign vehicle are variable maintenance costs (i.e., the actual expenditure for road maintenance)⁵

⁴ In the remainder of this chapter, COMESA will be referenced for policies and activities undertaken by COMESA and its predecessor, PTA.

⁵ The methodology employed by SATCC to calculate ESA costs consists of (1) Average Equipment Standard Axle (ESA) per axle whereby the average ESA for a vehicle over 5 tons varies from 2.2 to 3.5 depending on the axle limits of each country, (2) the total length of the paved network, (3) rehabilitation expenditures, (4) routine maintenance cost, (5) weighted ADTs across the network and a percentage of the vehicles over 5 tons multiplied by the average ESA for heavy goods vehicles multiplied the total of days in the year (the resulting yields total ESA km per year for the total road network), and (6) the cost per ESA is derived by dividing total annual maintenance costs attributable to heavy goods vehicles by the total ESA per km for the total road network.

7.4.2 COMESA

In contrast to the road pricing principle and pricing methodology proposed by SATCC, COMESA takes more of a structural engineering approach, whereby the road is considered as a load bearing structure. As such, the road is designed to bear a certain load for a finite design life. Using standard criteria such as average equivalent standard axles (ESAs) as the traffic loads, COMESA calculates the cost of road maintenance. COMESA also calculates road pavement damage costs for different types of heavy goods vehicles.⁶

7.5 Regional Road Pricing and Estimation Methodology

Following the review of both SATCC's and COMESA's road pricing policy and methodology for estimating pavement damage cost, the PTA's policy and methodology was selected due to the following

- COMESA's pricing policy is based on a full cost recovery methodology,
- availability of ADT data for paved roads,
- ESAs used in calculating road damage cost reflect prevailing legal axle load limits,
- total net payment costs include all rehabilitation and maintenance cost including the residual value of rehabilitation at the end of the design life of a road, and
- estimation of cumulative ESA during design of the road indicate pavement damage cost charges is the replacement cost of the paved road at the end of the design life.⁷

The findings and recommendations of the joint SATCC-COMESA study are under consideration for adoption by member countries. To date, no agreement among member states has been reached to adopt the COMESA's road pricing policy and methodology. It appears that some countries intend to select the SATCC methodology while others prefer the COMESA's methodology.

⁶ COMESA's methodology calculates ESAs on the basis of enforced axle load limits of 8.2 and 10.0 tons. Two figures are used in the calculation, a theoretical value and an expected value. The theoretical value is based on the assumption that all axles are loaded to the legal limit. The expected value is related to an assessment of the practical possibilities of optimal loading of HGVs, i.e. from the front steering which cannot be loaded to the theoretical limit without overloading. Calculations of ESA uses exponent value of 4.5. The PTA treats multiple axle groups separately. The components used to calculate ESA units costs include (i) AADT for different HGV for paved roads, (ii) design standards and economic life of the road, (iii) full depth rehabilitation costs at the end of the design life, (iv) total maintenance costs during design life of the road, (v) a residual value of 20 percent for rehabilitation costs at the end of the design life and (vi) the maximum ESAs are calculated on the basis of an enforced 10 ton axle limit.

⁷ Excerpted from the report "Review of Road Transit Charges" prepared by the Preferential Trade Area and Southern Africa Transport and Communications Commission August 1992, Lusaka, pp 7-8

7 6 Regional Roads Fund

There has been discussion in the region of establishing a “Regional Road Fund”, and such a Fund is mentioned in the SATCC Protocols. The use of a regional road fund has been mooted to fund, on the one hand, road management and maintenance activity (presumably for the Regional Trunk Road Network) and on the other hand, to encourage harmonization between the member states by supporting regional research and other projects.

The funding of such a Road Fund could come from a number of sources, including cross-border transit charges, fuel levies, and government budgets. It is, however, a widely-held view – and we concur – that at the moment, such a Fund is not practical, nor would it currently be acceptable to most countries in the region.

As stated in the “Proposed System of Harmonized Road Transit Charges for the SADC Region, Volume 1 – Main Report”

“In principle, the objective of setting up a Regional Road Maintenance Fund is a laudable one and very much in keeping with the spirit of an economic union such as SADC, in which the “stronger” countries help the “weaker” ones for the mutual benefit of the region. Such a fund could offer a number of potential benefits to the region but a number of issues need to be investigated before the feasibility of such a proposal can be established. In this respect the following issues are pertinent

- The need to firstly assess the financial viability of such a fund which is still dependent on the success of national road funds, most of which are still in the process of being set up,
- The mechanics of implementing, operating and managing such a supra-national fund in a regional setting,
- The development of a uniform method for prioritising trunk road maintenance needs in the region which is dependent on the setting up of national Road Management Systems, most of which are still not yet implemented,
- The implications of only some member states deciding to join in the establishment of the fund,
- The method of system to be adopted for the allocation of the available funds to the various countries and their financial contribution towards the funding of a particular project,
- The legal issues involved in setting up a Regional Road Maintenance Fund ”

A primary need in the region is to encourage nations to develop the policies, institutions and implementation that enable them to effectively achieve and adhere to appropriate maintenance standards. There is a concern in establishing a regional fund for road maintenance that would involve the creation of a supranational layer of bureaucracy – with all of its potential implementation problems - to assume a responsibility for which it would be desirable, initially, that the national authorities develop the capacity to fulfill. And if the national road maintenance authority is capable of and required to maintain the national component of the regional trunk road system, then is a regional entity necessary?

The availability of funding to carry out regional studies and research is of undeniable importance. Such activities may be funded through SATCC and regional stakeholder organizations. The use of a regional road fund, with funding that is not project-specific and concerns about rigidities and accountability, may not be the best way to fund such activities.

7.7 Inter-modal Competition

Inter-modal competition (i.e., road and rail competition) is primarily an issue of pricing transport services and allocation of resources. Road transport operators and railway executives' responses vary regarding the question of government's preferential treatment of one mode over the other. Under a regime of perfectly competitive transport markets, price and competing transport suppliers are the determining factors as to the availability and quality of service. Transport markets in southern Africa in general tend to be inefficient. This is largely a result of intrusive economic regulations imposed by national governments. Typically, such regulations affect domestic and international market entry, licenses, permits and fees, duties and excise taxes, foreign exchange allocations, and in some cases, tariff and rate setting. These economic regulations often distort transport prices and introduce market bias in the allocation of resources because the established price of transport deviates from its marginal cost. However, despite the railways' monopoly position or the direct investments in the road sector, it is not clear that national governments favor one mode over another. Inter-modal competition and transport market share, in many cases, tend to be more a question of user preference based on service quality and reliability rather than government intervention in transportation markets.⁸

Railway operating losses and replacement of renewable assets (equipment, track) more often than not are financed from general revenues through subsidies and external assistance from donors and multilateral financial institutions.⁹ Moreover, all railways in southern Africa are government monopolies. Road infrastructure, on the other hand, is directly financed by government investments and external assistance. The so-called "level playing field for transport" is a spurious argument because in southern Africa both the railway and the road sector are dependent on either direct or indirect subsidies from national governments. And in neither case are railway freight or road service and infrastructure priced on the basis of their marginal cost, whereby the marginal cost is equal to the marginal benefit to the users. Users do not pay the full cost for using the service.

Countries such as Malawi, Mozambique, Tanzania, Zambia, and Zimbabwe are taking steps, at the insistence of the World Bank and bilateral donors, to liberalize their transport sectors to permit more efficient functioning of transport markets through market-based price signals. Consequently, the argument that governments favor one sector over another is, in fact, a *non sequitur*. Because neither the rail nor road sector applies the principle of marginal cost in its pricing strategy, they cannot be said to be maximizing social welfare. Moreover, while the above discussion deals with the broad question of road-rail competition,

⁸ The demand for transport in southern Africa because of high terminal costs (e.g. loading, wait time and unloading) are more affected by the total cost of transport. For example, road transport is often twice the cost of rail transport on a ton-mile basis. However, when line haul terminal loss and spoilage costs are taken as a whole, road transport, coupled with speed and reliability, is actually cheaper than rail.

⁹ Pricing railway services on the basis of long-run marginal cost is the most optimal and efficient way to provide railway service and ensure that adequate funds are available to finance the cost of current operations plus depreciation to cover the replacement cost of fixed assets.

road-rail competition was not an issue in any of the discussions with public or private stakeholders in the seven countries studied

7 8 Findings and Conclusions

One of the main findings of this chapter is that fuel levies, licenses and transit fees are the most widely applied charging instruments in use in the countries studied. Few countries apply other instruments such as heavy vehicle fees, bridge tolls, overload fees, duties or excise taxes on vehicles and spare parts as revenue enhancing mechanisms to finance road maintenance.

Notwithstanding the widespread use of the fuel levy as the main source of revenues for the Road Funds in most southern Africa countries, the issue of who should collect the user charges remains problematic. As the country reports indicate, none of the Road Funds studied collect their own revenues. This fact, as in the case of Tanzania and Mozambique, presents cash flow problems for Road Funds because the Ministry of Finance quite often retains the funds in its own account longer than anticipated. In addition, there is also concern that less than the full amount of funds is eventually provided to the road funds.

The main and perhaps most important conclusion arising from the joint SATC-COMESA study is that cost recovery pricing policies based on ESA unit costs attributed to road use are the most optimal road pricing policies. Such pricing policies would result in the most efficient allocation of resources in the road sector and, indeed, the regional and national economies.

As the above country reports indicate, not all SADC member countries apply the road pricing policy and methodology set forth by the joint SATCC-COMESA study. Although the World Bank required countries such as Malawi, Mozambique and Tanzania amongst others to set forth a Transport Policy as a condition of multilateral assistance, in practice, the road pricing policy in most of the countries under study often is unclear and unrelated to road pavement damage costs or road use cost. Absent such a pricing policy, road financing in the southern Africa region will never achieve full cost recovery for road maintenance.

Finally, the collection of fees from road users is an ideal way to involve the private sector, particularly the collection of transit fees, weigh bridge fees, overload infraction fines, bridge and toll fees. Such collections are ideal functions for The Model Transportation Center and Border Post or the Model Heavy Vehicle Management Center as recommended in Chapter 8.

As regards road-rail competition, despite the almost intractable positions held by the interested parties from both the road and rail sectors, this issue did not arise during the course of the field studies. Thus, road-rail competition is not regarded as a priority issue to be addressed in improving highway management for southern Africa.

7 9 Recommendations

A number of regional and other institutions either under the World Bank's RMI framework, COMESA or SATCC auspices or other similar frameworks have been active in promoting appropriate road financing and taxation policies for road maintenance in southern Africa. In view of the ongoing joint efforts by COMESA and SATCC to harmonize road pricing policies and adopt a standard methodology for estimating pavement damage cost, it is recommended that USAID not seek any involvement in this area at this time.

CHAPTER 8. RECOMMENDED ACTIONS TO IMPROVE REGIONAL HIGHWAY MANAGEMENT

8 1 Background

Based on interviews with public and private stakeholders (i e , road transport operators, freight forwarders, donors and government officials) as well as transport consultants, four specific interventions are proposed. These recommendations, when implemented, will significantly improve the movement of goods throughout southern Africa. They received broad support in virtually every country under study. Some have been implemented to some degree but with limited success. While most of these actions have been identified previously and discussed in various regional public and private fora, these recommendations are new and innovative approaches to achieve successful outcomes in highway management.

In developing the recommendations for USAID, the following factors were considered. These included

- (1) stakeholder ownership,
- (2) the scope for implementation by the private sector,
- (3) a partnering approach involving both public and private interests,
- (4) the potential impact on regional market integration,
- (5) the reduction of regional transportation barriers,
- (6) the potential regional economic benefits,
- (7) the impact on preserving the regional trunk road network,
- (8) the formulation of an innovative approach to achieve successful project outcomes, and
- (9) interventions that complement existing or proposed highway management initiatives.

8 2 Recommended Actions

Four actions are recommended for USAID/RCSA. They are presented section 8 4.

- | | |
|-------|----------------------------------------------------------------------------------------------------------------|
| 8 4 1 | Model Heavy Vehicle Weight Management System (Privately Operated Weighbridge Management System) |
| 8 4 2 | Model Transportation Center and Border Post (Privately Operated Transportation Center) |
| 8 4 3 | Model Road Safety Initiative (Privately Operated Road Safety Initiative) |
| 8 4 4 | Internet-resident Road Definitions and Standards Manual (Private Sector Initiative in Road Management Systems) |

Section 8 3 first discusses general implementation steps needed for these recommendations. Section 8 5 summarizes additional recommendations that were considered by the Consultant, but not proposed.

8 3 Implementation of Recommended Actions

8 3 1 Issues Primarily Pertinent to the Heavy Vehicle Weight Management System, Transportation Center and Border Post, and Road Safety Initiative (Recommendations 8 4 1, 8 4 2 and 8 4 3)

In seeking proposals for the first three initiatives (8 4 1, 8 4 2 and 8 4 3), it is recommended that RCSA encourage novel partnerships between business and government, and seek innovative mechanisms in this respect. RCSA should make the proposers responsible for investigating and making the necessary arrangements for government support or involvement. Such support may include regulatory change or approval and financial participation. Participation may be in the form of agreed services to be provided by public or private sector, or even by joint public-private venture. Proposers should also be responsible for addressing country-specific issues, constraints and opportunities.

The projects will be justified in and of themselves – as self-sustaining enterprises, and as demonstration or pilot efforts. Also, the process of preparing the responses to the RFP will provide impetus to dialogue and change. In particular, the process should encourage new ideas for private sector involvement in road sector management, and should enable stakeholders to identify and remove barriers to such endeavors.

Public and private stakeholders in individual countries have expressed interest in and support for these projects. The process of preparing proposals should involve considerable dialogue on the part of public and private entities.¹

Although the recommended initiatives are innovative, project development by USAID should follow normal Handbook 14 and Handbook 1 procurement arrangements. Thus, within the scope of normal USAID systems and procedures, the following approach may be recommended for RCSA to follow in preparing the RFPs.

¹ *Vehicle weight management* is identified universally within the region as a problem that needs to be addressed. SATCC and COMESA have specifically identified this as a priority. Amongst the ongoing initiatives, Zambia's Road Board is planning to contract weighbridge management to private entities. South Africa is already doing such contracting (a private company, V3, manages weighbridge stations in South Africa, and plans to expand regionally) and Botswana is considering (albeit at an early stage) the possibility for private weight management.

Malawi, Tanzania and Zambia are amongst the SADC countries that have expressed support for such *border post initiatives*. The Maputo Corridor (Ressano Garcia/Kommatipoort Border Post) will be a one-stop post possibly using BOT arrangements.

Malawi, Zambia and South Africa all have strong ongoing *road safety initiatives* and have expressed support for such private initiatives. Malawi has requested donor assistance in pursuing a road safety initiative.

Determine Responsible entity

It is desirable that public agencies become active participants in the preparation of proposals. Multiple ideas are desired, and numerous proposals should be welcomed from individual countries. However, while every effort should be made to involve national public sector stakeholders in the planning for the project and RFP, individual governments should not be the “owner of the RFP” – that is, RCSA should not work through selected governments for project implementation. Rather, SATCC as a proven regional entity, would be an appropriate “owner” for the project.

A possible alternative, if interest and commitment are sufficient and if appropriate mechanisms could be found, would be for a specific cross-border initiative to be vested jointly in the agencies of two countries.

Advertisement

Alert private and public entities of the proposed project scope, and invite interested parties to a workshop (single or multiple) to present the broad ideas and approaches.

Workshop

One (or more, if in multiple locations) workshop to present the basic project ideas and requirements, to obtain feedback and input, to explain the project objectives and to explain bid eligibility, content and format, and to allow interested parties to begin their preparations and dialogue. Workshop documentation should be made widely available within the region, to entities that do not participate in the workshop.

Project Design and Preparation

A suitably detailed project design and preparation, to establish in a suitably detailed fashion the project parameters and framework, will need to be carried out by USAID, with COMESA, SATCC or other appropriate participation.

A PID document and Project Paper and/or PIO/T will have to be prepared. Consultant assistance may be needed by USAID to prepare the PID, Project Paper and Scope of Work.

The project design work should more fully define the content, implementation approaches and mechanisms of the project – leaving the details sufficiently flexible to allow proposers to offer innovative ideas and approaches. Proposal evaluation criteria will need to be delineated and project monitoring indicators defined. Background investigations should be carried out to delineate these factors to identify potential responses in greater detail, to fully involve the cooperating agencies and brief governments. An analysis of the economic and financial justification and sustainability is also needed. Engagements and agreements with cooperating agencies such as SATCC, COMESA or others will need to be defined.

The design should also focus on delineating, inter alia

- Desired project objectives, including
 - Sound results of the enterprise (performance and financial impact on the road sector and road sector stakeholders),
 - Financial sustainability,
 - Demonstration impact and pilot aspect, and
 - Policy impact
- The desired content of proposal submission – key elements of submission
- Other information to be provided to recipients of the RFP

8 3 2 Additional Issues Pertinent to the Internet-Resident Road Definitions and Standards Manual (IRDS) (8 4 4)

As for the other recommended initiatives, project development by USAID for the IRDS would follow normal Handbook 14 and Handbook 1 procurement arrangements. Cooperating agencies would be identified and agreements reached between USAID and them. PID and Project Paper and/or PIO/T development would follow normal USAID procedure, and would likely require some input from consultants.

The Internet-Resident Road Definitions and Standards Manual is supportive of harmonization and functioning of Road Management Systems in the region. It can fulfill this function irrespective of the Regional Road Management System (RRMIS) that is to be supported by CIDA, although it clearly would also be supportive of and complementary to the RRMIS and can be planned and implemented in conjunction with it. While it does not have to be integrated *within* the RRMIS, the IRDS clearly, to avoid duplication and to be current and useful, must be coordinated with the RRMIS design.

The IRDS and RRMIS are, however, very different items. The IRDS and RRMIS are focused on different types of data and uses. IRDS is a design tool and data base, whilst the RRMIS is intended to be a more dynamic, policy-related tool. The development and implementation of the RRMIS will likely be an effort that will require 2 to 3 years or more, the IRDS could be operative within 3 to 6 months. SATCC will be the centralized base for the RRMIS, and will have to deal on an ongoing basis with management and update of a large volume of data. By contrast, there is no compelling reason for the IRDS to be centralized within SATCC, and, in fact, would perhaps most appropriately be housed within a southern African university or research organization (CSIR would be one example).

Thus, while coordination with the RRMIS is desirable, there are also potential advantages in functionally separating the IRDS from the RRMIS – notably the ability to avoid centralization and bureaucracy,

105

incorporating private initiative and interest in maintaining the information and its use, and allowing the IRDS to be quickly established and not delayed by the RRMIS time-frame. There would be few, if any, economies of scale in co-locating the RRMIS and IRDS.

If the timing and mechanisms permit, RCSA could consider implementing this initiative under a co-financing arrangement with CIDA. The opportunity should be investigated. However, some considerations would mitigate against such an arrangement.

- As mentioned, the different time frames for RRMIS and IRDS,
- The lack of need to co-locate the systems, and possibly advantages in using separate servers and locations,
- The relatively low budgets involved (US\$ 2 million for IRDS and C\$ 11 million for RRMIS), and
- The differing procurement arrangements of USAID and CIDA.

The project design should specifically consider and work out possible arrangements for technical and financial sustainability of the IRDS. Subscriptions will be one likely source for ongoing financial resources.

SATCC or COMESA may participate in the implementation of the initiative as cooperating agencies.

12/6

8 4 Project Recommendations

8 4 1 Privately Operated Weigh Bridge Management Systems

Title of Action	Model Heavy Vehicle Weight Management System
Estimated costs	US\$3-4 million
Implementation Approach	Request for Proposal
Qualified Offerers	<ol style="list-style-type: none"> 1 National Governments/Agencies 2 Regional Institutions 3 National or Regional Transport Associations 4 Private Firms or Institutions
Key Outputs	<ol style="list-style-type: none"> 1 Institutional Structure to Manage and Operate an Effective and Sustainable Overload Control System 2 Managerial and Technology Transfer for Operations and Enforcement of an Overload Control System
Cooperating Agency	<ol style="list-style-type: none"> 1 Southern Africa Transport and Communications Commission

Recommended Action

Stakeholders such as road transport operators, freight forwarders, donors and government officials are in agreement that the more than US\$50 billion regional road network is being destroyed at a faster rate than it is being improved. With approximately 90 percent of the region's trade dependent on road transport, the preservation, maintenance and improvement of this critical infrastructure must be of paramount importance.

The destructive impact of vehicle overloading and the urgent need for more effective axle-weight control management has been recognized by the SADC member countries since 1985. In 1991, five SADC countries (Botswana, Malawi, Namibia, Tanzania and Zimbabwe) conducted a study of the problem and developed a set of recommendations for improvement. In February 1998, experts from ten SADC countries reported that very few, if any, policy or other actions were being taken to arrest the deterioration of the road network attributed to vehicle overloading. The most positive action reported was that the majority of countries had begun procuring or that they had received new weigh bridge equipment. However, they lack the financial resources to operate the new equipment.

Given the fact that for more than fifteen years little, if any, effective actions have been taken to improve overload control in southern Africa, new, innovative and far-reaching efforts involving new players are needed.

Recommendation and Implementation Approach

This recommendation is for USAID to prepare and issue a Request for Proposal (RFP) for a three-year Model Heavy Vehicle Weight Management System (MHVWMS). The MHVWMS should be privately designed, built, managed and operated as a demonstration project. The suggested project design would include initial USAID support for two years with an option for a third year with the successful offerers' right to exercise the option upon completion of an independent project evaluation and a favorable determination at the end of eighteen months.

The MHVWMS project is to be implemented in two or more countries with common borders to achieve scale economies and efficiencies. Countries will be selected using a Request for Proposal (RFP) approach issued by USAID. The selection criteria would, *inter alia*, include (1) level of partnering such as type and nature of offerers' contributions, (2) degree of private sector participation, (3) the specific country's institutional framework for private sector participation and enforcement of violations, (4) innovation of the project design concept, (5) proposed implementation schedule, and (6) a three-year financial pro forma statement. The objectives of this approach are (1) assess and verify the extent of stakeholders' interests and commitment, and (2) establish standardized procedures to evaluate offerers' responses. Public officials and private stakeholders in each of the countries under study expressed their commitment for an effort of this type. Additionally, the potential for high investment returns are clearly evident.

Estimated Cost and Success Probability

A number of SADC countries (e.g. Botswana, Malawi, Tanzania, South Africa and Zambia) have recently acquired or are soon to acquire a sizable number of weigh bridges. While some countries already have such legislation in place, others are contemplating legislation permitting private sector participation in overload control management. As such, the scope for private-public sector partnering will offer a new framework for achieving an effective and sustainable system of overload control. Similarly, stakeholders' commitment through an RFP process should be easily understood, simple and quick to initiate. The expressed support from public and private stakeholders in most of the countries visited indicates a high probability of success.

A Model Heavy Vehicle Management System could easily be effectively designed and implemented for an estimated US\$3.0 to \$4.0 million. Additionally, an effective management system designed and operated by the private sector, which enforces the overload control fines, can generate substantial dividends both in infraction fines and ensuring the quality of the road network.

8.4.2 Privately Operated Transportation Center

Title of Action	Model Transportation Center and Border Post
Estimated Costs	US\$2.5-3.0 million
Implementation Approach	Request for Proposal
Qualified Offerers	<ol style="list-style-type: none"> 1 National Governments/Agencies 2 Regional Institutions 3 National or Regional Transport Associations 4 Private Firms or Institutions
Key Outputs	<ol style="list-style-type: none"> 1 Institutional Structure to Manage, Own or Operate an Effective and Sustainable Model Transportation Center and Border Post 2 Managerial and Technology Transfer for Operations of a Model Transportation Center and Border Post
Cooperating Agency	<ol style="list-style-type: none"> 1 Southern Africa Transport and Communications Commission 2 COMESA 3 National Governments

Recommended Action

This is a recommendation for USAID to support the establishment, on a Build Own Operate/Build Operate Transfer basis, of a Model Transportation Center and Border Post for two or more common border states. The RFP envisions a Center, preferably at the border of two countries, but it could also be located at a Port of Entry. Between two countries, such a Center would eliminate the current "one on each side" approach. The Center would be constructed and initially operated on a Design, Build, Operate and Transfer approach. It would be automated with modern communications and computer equipment to service user needs and provide real-time information to relevant authorities (i.e., Customs, Police, Road Department). The Center could provide axle-weight inspections and customs-related services. The Center could also serve as a "one-stop payment point," coupon collection point, or point for electronic payment of transit fees required in the transit or destination country.

The main concern expressed by private stakeholders (i.e., road transport operators and freight forwarders) is the amount of time lost and administrative costs involved at border posts in paying transit fees and processing customs documents. Often as many as 12 to 15 separate fees are involved to move goods from

one country to another or simply to transit a second country for delivery to a third. The concern is not the amount of the fee, but rather in (1) the number of documents, (2) the number of separate payments, (3) the time required, (4) the delay at the border, (5) the graft at each point, and (6) the separate inspections.

Several stakeholders have indicated that significant transport cost savings could be realized with the use of a uniform customs document and the creation of a one-stop transit fees payment point. Some stakeholders estimate that between 5 and 10 percent of the freight charge could be saved under such a regime. The second major concern of stakeholders was gross vehicle overloading, which destroys the infrastructure and distorts transport costs for short-term savings and has long-term adverse consequences.

Previous efforts to introduce a uniform or single customs document and streamline transit payment procedures in Malawi, Tanzania and Zambia have shown some promise. For example, in the Northern Corridor project (Tanzania, Kenya, and others), there was a "one document" or uniform transit document that was accepted by all nations. Similarly, Malawi and Tanzania have had some success in utilizing a "single document" approach for the Malawi Cargo Center project.

Recommendation and Implementation Approach

This recommendation is for USAID to issue a Request for Proposals (RFP) inviting qualified offerers from all SADC member countries under a public-partnership arrangement to Build Own Operate/Build Own Transfer a Model Transportation Center and Border Post. In the proposal, the successful offerers would, *inter alia* (1) detail the type and nature of the individual country inputs in a partnering arrangement, (2) describe the level and type of private sector participation in building, managing and operating such a facility, (3) detail the services to be offered at the facility (i.e., weigh bridges, single customs document, a one-stop transit payment or coupon), (4) propose an innovative design concept that addresses all of the equipment, MIS, operational and specifications in the RFP, (5) propose an implementation schedule, and (6) provide a three-year financial pro forma statement.

Estimated Project Cost and Success Probability

South Africa has already embarked on an effort to develop a number of private-public-partnerships, such as Traffic Management Centers (TMC's), and has received at least one unsolicited proposal for construction. This concept was presented recently at a SATCC Workshop that included officials from ten SADC member countries and received a favorable response. Private stakeholders, such as the Road Freight Associations and freight forwarders in Mozambique, Tanzania and Zambia are especially supportive of the concept. In addition, including a weigh bridge at the facility could encourage additional support. Given the expressed interest by public and private stakeholders, the probability of successfully initiating a simple, straightforwardly designed BOO/BOT for a Model Transportation Center and Border Post project is considered high.

The estimated cost is US\$2.5 to \$3.0 million, US\$1.0 million to construct and US\$0.5 million to fund recurrent costs for the first three years of operation. After the initial three year start-up and development phase, the Center should be self-sustaining and likely profitable. Operating income would be generated from overload infraction fees, transit charges and other service fees provided at the Center.

8 4 3 Privately Operated Road Safety Initiative

Title of Action	Model Road Safety Initiative
Estimated costs	US\$3 million
Implementation Approach	Request for Proposals
Qualified Offerers	<ol style="list-style-type: none"> 1 National Governments/ Agencies 2 Regional Institutions 3 National/Regional Transport Associations 4 Private Firms or Institutions
Key Outputs	<ol style="list-style-type: none"> 1 Institutional Structure to Manage and Operate an Effective and Sustainable Road Safety Program 2 Managerial and Technology Transfer for a Road Safety Program
Cooperating Agencies	<ol style="list-style-type: none"> 1 Southern Africa Transport and Communications Commission 2 COMESA

Recommended Action

In the early 1990's, a United Nations survey found that the incidence of road traffic accidents in Africa was estimated to be 50 times those in the industrialized countries and much greater than any other region in the world. A 1992 World Bank Study² found that road accidents are the second highest cause of early death in the developing countries for the 5-44 age group. In most African countries, the cost of road accidents is between 1-2 percent of GNP.

While most of the SADC countries have initiated road safety programs, few, if any, actual resources are being expended to reduce accidents and improve road safety. A prospective road safety program should include (1) the identification of high incidence accident sites and a proposal to mitigate, (2) development of a hard-hitting road safety campaign, (3) proposal and action for getting dangerous vehicles off the road, (4) campaign to identify and remove drunk drivers, (5) development of an accurate statistical base of accidents, injuries and fatalities, and (6) proposal for community involvement in accident reduction.

This recommendation is for USAID to provide support for a privately operated Model Road Safety Initiative. This would consist of a safety audit on either a corridor, national high traffic volume route or

²Ross, A, report entitled "A Review of World Bank Experience in Roads Safety", 1992

routes, a safety campaign, and a three-year recording of safety/accident statistics. The project would be operated by a private firm and would demonstrate that "Safety Pays."

It may be difficult to design a profitable private sector effort in this area. However, it should be fairly easy to demonstrate that a well-run, privately-operated safety program can significantly reduce road accidents.

Recommendation and Implementation Approach

This recommendation is for USAID to issue a Request for Proposal (RFP) inviting prospective offerers under a joint public-private arrangement to initiate a Road Safety Initiative (RSI). The RSI could be initiated either in a transport corridor or on a high traffic route or routes. To achieve success, countries in partnership with private sector firms, groups and associations must have ownership of the RSI. The RFP should specify that each offerers' proposal include (1) the specific level and type of resources they will commit towards a three year model initiative in safety management, (2) detailing how they would conduct a road safety initiative, (3) the level of private sector involvement they are legally and willingly permitted to commit, and (4) a three year action plan detailing, *inter alia*, the management structure, technical and other inputs, promotional strategy, implementation schedule, proposed targets and methodology for reducing road accidents.

Estimated Cost and Success Probability

Reliable accident statistics and related information are, for the most part, rather sparse and not collected with any degree of regularity or uniformity in the region. Countries which collect data regularly include Zambia, Malawi, South Africa and Tanzania. In Tanzania, for example, accident statistics indicate that in 1994 there were 13,781 vehicle accidents. The number killed was 1,548 and the number injured was 12,377.³ Road managers in Tanzania report that the frequency of accidents has increased rapidly in recent years, doubling in the last ten years.⁴ The risk of being killed in a traffic accident in Tanzania is 30-40 times higher than in Norway.⁵ Malawian statistics appear equally grim. For example, in 1995, more than 1,100 people were killed and more than 3,400 injured in road accidents. The cost of road accidents in Malawi was estimated at more than US\$80 million, or nearly 5 percent of GDP. Malawi's fatality rate from accidents is more than 100 times that of the UK and more than three times that of Kenya. The opportunity and probability for success in running a private sector-driven, multifaceted safety program is immense.

The incidence of road accidents in Zambia is also high. The average number of people killed between 1990 and 1995 was 775 or, some 13 percent of the average number of accidents reported. Zambia, however lacks an effective road safety program.

³The World Bank estimates that road accidents and fatalities in underdeveloped countries are more than 20 percent.

⁴Ministry of Works, Road Safety Programme, Final Report Tanzania, 1996.

⁵Chiduo C W "Institutional Setup of Road Safety Activities" Ministry Of Works, Tanzania 1997.

Many of the SADC countries have already determined the need for a road safety program and some have initiated such programs. However, few have actually implemented an effective campaign. An estimated US\$3.0 million at approximately US\$1.0 million per year would demonstrate the value of such an initiative and yield significant social benefits.

8 4 4 Private Sector Initiative in Road Management Systems

Title of Action	Internet-Resident Road Definitions and Standards Manual
Estimated Cost	US\$2,000,000
Implementation Approach	Request for Proposals
Key Outputs	Internet-Resident Road Definitions and Standards Manual
Cooperating Agencies	<ol style="list-style-type: none"> 1 COMESA 2 Southern Africa Transport and Communications Commission

Recommended Action

The term Road Management Systems (RMS) is not uniformly defined. This study defines Road Management Systems as a highway information system and a decision-support system. The highway information system collects, organizes and manages data and information. The decision-support system provides management applications to process data and enables informed decision-making for road network management. Typically, a database of information details the basic physical characteristics of the roads in the network, (i.e., length, width, drainage, surfacing, classification), and other data such as traffic counts and vehicle operating cost inputs necessary to objectively plan and manage a road network.

The recommendation is for USAID to assist in the development of regional highway definitions, standards and specifications sufficient to develop a database of the minimum level of data required to manage and maintain the regional network. Presently, SATCC/TU has in place a SADC Specification Book for the Design of Roads. In addition, SATCC/TU is developing a bridge and pavement design handbook. Further, COMESA and the United Nations/ECA have proposed, although they lack financial support, a joint effort to develop a road definitions and standards manual. Implementation of this recommendation would complement these efforts, and COMESA and UN/ECA are highly supportive of this type of initiative. It is recommended that USAID work in collaboration with SATCC/TU and COMESA to develop an Internet-Resident Definitions and Standards Manual for southern Africa.

The adoption of the USAID-funded SADC Protocols on Transport, which require member states to implement harmonized technical standards, is further evidence of the consensus for this initiative. The Protocols specifically require member states to harmonize standards for roads and bridge construction as well as maintenance of the regional trunk road network, including standard contract document specifications and standard methods of measurement.

Many SADC countries have developed a basic road management system. Some, like Tanzania and Zambia, have invested large sums of financial and human resources in a road maintenance system, a bridge

ME

management system, and other components. Other countries, such as Malawi, have invested very little in road management systems or data gathering during the past ten years. Botswana appears to be somewhere in the middle. Despite the effort of the SATCC Working Group on RMS, each country appears to be committed to its own RMS in defining data needs, data definitions and data uses. Until a regional standard is developed and adhered to, overall regional needs and priorities cannot be established. Additionally, valuable donor and national resources are being expended with little value added.

Recommendation and Implementation Approach

The recommendation is for USAID to issue an RFP to invite prospective offerers to develop an Internet-Resident Road Definitions and Standards (IRDS) Manual for access and use by all SADC member countries. The prospective RFP should, *inter alia*, require prospective offerers to specify (1) the methodology and approach to gathering information on road definition and standards, (2) the process of achieving consensus from stakeholders, (3) system design configuration and equipment requirements, (4) system for hosting and maintaining an internet resident manual, (5) the method by which stakeholders would gain access to an internet-resident roads definition and standards manual, (6) the method and approach for sustaining the system, and (7) a three-year financial pro forma statement.

U.S. consulting engineering firms and public agencies, such as the Federal Highway Administration, the American Association of State Highway and Transportation Officials, as well as a number of State Departments of Transportation, are especially suited for this type of initiative. A two-year technical assistance initiative coordinated closely with the SATCC-TU and the COMESA could result in the development and implementation of a uniform Roads Definition and Standards Manual hosted on the Internet. Such an initiative would appropriately address regional road management standards on the regional trunk road network in southern Africa and would complement other RMS systems now being proposed. It could be accomplished at an estimated cost of US\$2.0 million, and the savings could be significant since some countries are now spending more developing their own systems.

8 5 Additional Interventions Considered

In addition to the four interventions recommended, a number of other interventions were considered. These include (1) assistance for a privately-operated model road maintenance equipment center, (2) institutional capacity building involving training and technical assistance to Road Boards and Road Funds, and (3) toll road development and concessioning of roads.

8 5 1 Privately-Operated Model Road Maintenance Equipment Center

A privately-operated model road maintenance equipment center was also considered for USAID funding. Although such a center would greatly assist the capacity development of small to medium contractors throughout the region, it was not recommended for two reasons. First, establishing such a center would require a large initial capital investment to purchase equipment. Second, the intense effort required to organize the center and sustain it as a management and maintenance structure would not fall within USAID/RCSA management interests due to the time, costs and effort required to achieve full implementation.

8 5 2 Capacity Building for Road Boards and Road Funds

Consideration was given to strengthening the capacity of the region's Road Boards and Road Funds in the area of operating and managing a Highway Management System. However, such consideration was not advanced because it was concluded that weak Road Funds and Road Boards are more the result of inadequate funding commitments by the relevant road agencies and of unsatisfactory institutional arrangements, rather than the unavailability of trained staff. Were adequate funding available, managerial capacity could be vastly strengthened and would enable the Road Boards and Funds to recruit and retain competent staff. Moreover, many of the operational functions (i.e., collecting and analyzing highway information, managing overload control systems, collecting user fees, etc.) performed or envisaged by Road Boards or Funds can be contracted out to the private sector. The use of private contractors is more sustainable than a capacity building effort.

8 5 3 Toll Road Development and Concessioning of Roads

Toll road development and concessioning of roads, with few exceptions, tend to be medium- to long-run in terms of implementation prospects. This is especially evident given the existing legal and regulatory environments in the region. The existing legal and regulatory arrangements do not provide for concessioning of roads or toll road development. Given this, it was decided that concessioning of roads is a policy decision not subject to early reform or early implementation and should not be recommended.

USAID Southern Africa Regional Highway Management Systems Study

**ANNEX A:
SCOPE OF WORK AND WORKPLAN**

J E Austin Associates, Inc
June 1998

SCOPE OF WORK

OUT-PCE-Q-824-93-00031-00

Contract No PCE-0026-Q-00-3031-00

Delivery Order No 824

Page 2 of 17

ARTICLE I - TITLE

A Regional Highway Management System

ARTICLE II - BACKGROUND

The Southern African Development Community (SADC) is a grouping of twelve countries eleven mainland and one island country, Mauritius. This excludes the new members of SADC, the Democratic Republic of Congo and Seychelles.

The region, excluding Mauritius has a total road network of 714,000 kilometers. Of this, 103,000 kilometers are paved main roads, 113,000 kilometers are unpaved main roads and 443,000 kilometers are rural roads. Urban roads total 40,000 kilometers while unclassified (private, game park) roads are about 15,000 kilometers. South Africa accounts for 45.5% of the total roads and 57.8% of the main paved roads.¹

The asset value of the SADC road network is estimated at US\$72 billion. Deferred maintenance is estimated at US\$13 billion or 20% of the value. Road maintenance costs are estimated at US\$2 billion per year out of which 42% are funded.²

Of the main paved roads 56% are estimated to be in good condition 24% in fair condition and 20% in poor condition.¹ However, there are large disparities in the region with Botswana, Namibia, South Africa and Zimbabwe having a higher percentage of good roads while countries like Tanzania and Zambia have some of the poorest road conditions in the region. Poor road conditions contribute considerably to increased Vehicle Operating Costs (VOC) and therefore to freight charges and final price of goods and services. VOC are an additional but avoidable cost of doing business in the region and adversely affect the competitiveness of the regional economy.

The Protocol on Transport, Communications and Meteorology (PTCM) signed in August 1996, provides the framework for improved road management in the region. Chapter 4, Article 4.1 of the Protocol outlines the objectives to be achieved in road infrastructure.

Road reform has gained prominence in the region, partly as a result of the protocol, but largely through the World Bank funded Road Maintenance Initiative (RMI). The reforms are aimed at creating autonomous road boards, improved maintenance and management.

Transport and Communications Report to the SADC Annual Conference, Windhoek, 9-10, February, 1997 (SATCC-TU)

STEP/PAAS - Road Network Management and Financing Workshop, Maputo, January 1997

As in 1 above

18

and improved cost recovery through establishment of dedicated road funds. Countries are at varying levels of reform.

The United States Federal Highway Administration (FHWA) in collaboration with the World Bank has embarked on setting up Technology Transfer Centers in the region. One has been set up in South Africa and others are being initiated in Mozambique and Tanzania.

The USAID funded SADC Transport Efficiency Project (STEP) is working within the intergovernmental structures of SADC through the specialized transport and communications arm of SADC, the Southern Africa Transport and Communications Commission Technical Unit (SATCC-TU) based in Maputo, Mozambique, to promote policy reform in roads. Through the framework of the SATCC Sectoral Committee on Roads, Road Transport and Road Traffic, STEP has established two specialized technical committees to deal with specific infrastructure issues. These are the Road Network Management and Financing Task Force (RNMFT) and the Border Post Operations Working Group (BPOWG).

The private sector through the Federation of Regional Road Freight Associations (FRRFA) has been engaging governments and regional institutions on various issues related to road infrastructure and the road transport industry in general.

Road infrastructure issues are also addressed through other regional institutions notably the Common Market for Eastern and Southern Africa (COMESA) and the Southern African Customs Union (SACU). This is in addition to efforts by other donors and international organizations at both regional and bilateral levels.

ARTICLE III - OBJECTIVE

The objective of this delivery order is to produce a report that will assist USAID/RCSA to make an informed decision as to the best means of assisting SADC countries to put in place a regional highway management system. Such a system should lead to

- i. preservation of the RTRN,
- ii. improved maintenance standards and practices and overall improvement in the condition of the regional road network,
- iii. reduced maintenance costs,
- iv. improved cost recovery,
- v. improved overall coordination in the management of the regional road network,
- vi. facilitating the smooth flow of goods, services and people in the region, and

vii Increased private sector involvement in the provision and management of infrastructure

The report shall have clear recommendations and the proposed solutions shall be practical, achievable, sustainable and shall lend themselves to ownership by both governments and the business community in the region

Programs and activities arising from this activity are intended to contribute to achievement of the RCSA Strategy (1997-2003), specifically, the Strategic Objective 2 (SO2), "A More Integrated Regional Market" They are expected to lead directly to attainment of Intermediate Result 2 (IR 2) - Improved Telecommunications, Transport and Energy Infrastructure and the three sub IRs under it IR. 2.1 - Physical Infrastructure Built and Maintained, IR. 2.2 - Private Participation in Providing Infrastructure Services Increased, and IR. 2.3 - Regional Policies, Regulatory Frameworks and Operational, Technical Standards Harmonized These programs are also intended to contribute to IR. 1.1 - Trade Barriers Reduced

ARTICLE IV - SCOPE OF WORK

Through consultations in the Southern African region (excluding the Democratic Republic of Congo and Seychelles, the new members of SADC) with road authorities, governments, private sector entities, donors, regional institutions road users, and other stakeholders as well as review and analysis of relevant literature and from professional experience, interviews and observations, the contractor shall undertake the following tasks

- 1 Assess the current institutional structures in roads and propose ways in which they can be strengthened to function efficiently and respond to regional needs
- 2 Review and propose ways in which legislation can be harmonized across the region to support the new institutional structures and also facilitate creation of an enabling environment conducive to the participation of the private sector in infrastructure provision and management.
- 3 Review existing and proposed cost recovery systems, including road user charges, the setting up of dedicated road funds and propose measures to introduce an efficient, equitable and sustainable charging system that will lead to more effective resource mobilization and utilization and enhanced transparency
- 4 Review existing overload control systems and procedures and indicate ways in which a more comprehensive and effective regional system with possible private sector participation can be introduced
- 5 Address the issue of road/rail competition as relevant to the development of regional road management system

6. Propose any measures that would lead to the establishment of an integrated, effective and sustainable Regional Road Management System taking into account past and present experiences and lessons learned.

ARTICLE V - REPORTS AND DELIVERABLES

A number of studies have been carried out on these issues in the region over the years and various solutions proposed or tried. These have met with limited success as evidenced by the fact that problems still prevail in the region. A list of some of the reports is given in Annex 2. The COTR shall send a copy of each report to the contractor in advance using the most expeditious means. This list is merely indicative and the contractor shall determine what other reports may be available while in the field. The contractor is therefore expected to spend more time reviewing these reports and consulting with stakeholders in order to draw from experiences and enumerate lessons learned than undertake primary data collection. Where data collection is undertaken, it shall be for purposes of verification. The aim shall be to ascertain why solutions that have been tried have failed and what can be done to make them work or what new solutions can be proposed that can result in a better success level.

The proposals put forward shall be innovative and even radical and seek to introduce region-wide solutions that are sustainable. Emphasis shall be on proposals that lead to practical solutions which are achievable, sustainable and lend themselves to regional ownership by key stakeholders.

The contractor shall produce and submit a report to the COTR which shall include the following elements:

- a. Prioritization of issues and actions
- b. Definition of an Action Plan that clearly spells out:
 - i. practical steps/measures to be taken,
 - ii. target institutions and actions required from them,
 - iii. demonstration of regional ownership and commitment to proposed measures/solutions,
 - iv. financial implications of proposed measures and possible sources of funds,
 - v. role of the private sector,
 - vi. implementation modalities and timeframes,
 - vii. role of USAID/RCSA.

The Contractor shall prepare and submit the following deliverables/reports to the COTR as outlined below by the dates specified. The COTR shall approve all reports. The

OUT-PCE-Q-824-93-00031-00

Contract No PCB-0026-Q-00-3031-00

Delivery Order No 824

Page 6 of 17

Contractor shall submit all reports in hard copy form (number of copies specified below) and in diskette format, using WordPerfect 5.2 and graphics and tables shall be in Lotus 123 Version 4.0

Workplan - Two (2) copies of the workplan on approach and travel schedules no later than one (1) week from the contractor's arrival in Gaborone for discussion and clearance at RCSA with members of the Strategic Objective 2 (SO2) team on Market Integration,

Trip Reports/Findings- Two (2) copies of the trip reports/findings to be submitted no later than at the end of field missions for review by the SO2 team. The reports shall contain detailed notes on discussions, main issues, perspectives and recommendations as well as references of persons consulted and their contact addresses including telephone, fax and E-mail

Draft Final Report- Two (2) copies of the draft final report to be submitted no later than April 20, 1998 for review by the SO2 Team. The report shall contain outputs as outlined above

Final Report- Five (5) copies of the final report shall be submitted by May 11, 1998. The final report shall incorporate comments made by the review team. The Team Leader shall prepare the final report either in Gaborone or at home base

122

WORKPLAN PREPARED WITH RCSA AT PROJECT STARTUP (MARCH 2 – 8, 1998)

INTRODUCTION

A team of consultants from J E Austin Associates, Inc (JEAAI) under a sub-contract with Coopers and Lybrand, LLP will undertake field studies as part of the detailed study design, data collection, analysis, and report preparation phases of the Regional Highway Management System Study. This work plan summarizes the main features of the staffing plan, work schedule, project management approach and research methodology that JEAAI will utilize in fulfilling its responsibilities and executing the work set forth in the Scope of Work of Delivery Order No 824.

This Work Plan outlines how members of the study team with various disciplinary backgrounds will be deployed on a country-specific basis to accomplish the tasks specified in the Scope of Work. Additionally, an itinerary for the field work is presented.

REVISIONS TO THE SCOPE OF WORK

Following consultations with USAID/RCSA's technical officers it was agreed that Task 5 of the Scope of Work which relates to rail-road competition would be deleted from the consultant performance requirements. To the extent the issue of rail -road competition emerges as a key issue during the course of the study, it will be treated as an area for future research investigation under a separate study.

WORK SCHEDULE AND TIMETABLE

Mobilization of the team of consultants that will undertake the field investigations took place between 28th February and 1st March when the U S based personnel arrived in country. Finalization of the study design, project management plan, data collection and analysis methodology commenced during the week of 2-6 March.

TEAM STRUCTURE AND COMPOSITION

The full study team consists of 6 senior consultant staff who will be engaged during the study for periods ranging from a few days and up to 8 weeks to collect data, perform analyses and prepare a report on highway management activities in the 6 targeted countries. The team's breakdown and areas of discipline are as follows:

Team Leader - Dr Samuel Mintz,
Regional Highway Engineer - Kenneth R. Rikard, P E ,
Highway Management Specialist - Chiyooowa Chiyooowa,
Institutional Specialist - C Martin Webber,
Senior Planner and Policy Specialist - Joe Revis, and
Information Systems Expert - Alf Persson,

The work will be divided between two sub-teams, a field studies team and a research team. The field studies team consisting of Dr Mintz, Mr Rikard, and Mr Chiyooowa will have the responsibility for collecting all the relevant data in the field, undertaking the primary data analysis,

writing of both country-specific Trip Reports and key chapters of the Draft Final and Final Reports

The research team consisting of Mr Webber, Mr Persson and Mr Revis will work in Washington and support the field studies team with research materials, as necessary. They will conduct data searches and review relevant technical studies and reports. They will also conduct follow-up interviews at the World Bank, the U S Federal Highway Administration and consult with the American Association of State Highway and Transportation Officials. This team will also participate in the report writing and provide key institutional inputs for the Draft Final and Final Reports

With the exception of Mr Alf Persson, the Information Systems Expert, whose services will be utilized for a short period of time, all of the team members will be engaged in their respective areas of expertise for periods ranging from 2 to 6 weeks from 23rd February through 31st May

As agreed with USAID/RSCA, the field studies will be conducted in two Phases. Phase I include the countries of Botswana, Malawi, Mozambique, Zambia, Zimbabwe and Tanzania. Field studies in South Africa will be conducted in Phase II and will commence about mid-April and will be followed up with preparation of a Trip Report, Draft Final and a Final Report

STUDY APPROACH AND METHODOLOGY

The approach and methodology for conducting the study involves data collection, analysis, development of strategic interventions and report writing. The study methodology is set forth in Attachment A of this Work Plan. As the schematic indicates, the field studies team will consult with stakeholders, i.e. public officials, road transport operators and the road freight operators associations, freight forwarders, major shippers and receivers, private financial institutions, private road construction companies, etc. The purpose of these contacts will be to, (i) collect information on institutional structures, existing road management systems, cost recovery, capital investment, legal framework, determine the scope for private sector involvement in all aspects of highway management and maintenance, (ii) assess the impact on users as it relates to user charges, and (iii) identify key interventions for improving highway management, and (iv) build ownership of the most promising highway management and maintenance interventions

To this end, the team will conduct an institutional analysis of road administrations, road maintenance and management programs, overload control systems management and assess the legal and regulatory framework of such systems

Additionally, the team will conduct a road financing and investment analysis to gather information regarding user charges, highway investment and expenditures, and cost recovery from the perspective of both the public and private sector

As the schematic indicates, data gathered from each country will be analyzed in order to isolate the strengths and weaknesses of existing highway management systems, other institutional structures, cost recovery systems, legal framework, and the scope for involving the private sector in highway management, etc

The results of these analyses are expected to yield a set of strategic interventions for a highway management system in the following areas: (i) alternative institutional structures such as the requirements for establishing a regional highway management system, (ii) required legislative and regulatory reforms, and (iii) private sector involvement in managing and maintaining the region's highway system

24

WORK SCHEDULE AND DEPLOYMENT OF THE STUDY TEAM

Allocation of the team members professional time will be utilized in accordance with the following work schedule

- 1 During Week 2 of the study (2-8 March) the field studies team will (i) develop a detailed project plan and study design for executing the study, finalize the schedule of interviews and target countries to be visited, and (ii) consult with USAID/RCSA and gain acceptance of the Work Plan
- 2 During Weeks 3 and 4, (8-18 March) the field studies team will conduct visits to each of the countries selected to participate in the study
- 3 Midway through Week 4 to the end of the week (18-20 March) the field study team will assemble in Lusaka and begin drafting the Draft Final Report. The Team Leader will coordinate this process, supervising the final preparation of all Trip Reports and writing of the Draft Final Report and ensuring consistency of analysis and report writing
- 4 In Weeks 5 and 6 (23-27 March and 30 March- 3 April), the study team will complete preparation of the Draft Final Report that covers Phase I countries
- 5 During Week 7 (6-13 April) the Team Leader will conduct a field visit to South Africa and, upon completion of the field work will prepare a Trip Report and begin final preparation of the Draft Final Report
- 6 At the end of Week 8 (13-20 April), the Team Leader will return to Botswana and make a presentation to USAID/RCSA of the study's findings, conclusions and recommended interventions. Additionally, the Team Leader will submit the Draft Final Report in accordance with the report deliverable requirements of the Scope of Work on or about 20 April
- 7 During the week of 25-31 May and upon receipt of USAID/RCSA's comments on the Draft Final, the Consultants will incorporate said comments and submit a Final Report on or about 31 May

REGIONAL TRAVEL SCHEDULE

As indicated above, following Week 2 of project planning, detailed study design and consultations with USAID/RCSA, travel within the southern Africa region to conduct field visits will commence in accordance with the following schedule

Dr Samuel Mintz	Mozambique (8-14 March) Zambia (15-20 March)
Kenneth R. Rikard, P E	Malawi (7- 12 March) Tanzania (12-17 March) Zambia (17-20 March)
Chiyooowa Chiyooowa	Botswana (9- 12 March) Zimbabwe (12-17 March) Zambia (17-20 March)

125

INTERACTION WITH RCSA

Because the team is divided into two sub-teams namely the field studies team and research team, it will be difficult to maintain on-going contact with USAID/RCSA's technical officer during the field visits. The following contact and reporting arrangements are proposed:

- a Introductory meeting with USAID/RCSA Technical Officer by the field studies team on 2 March,
- b Submission of a detailed methodology for carrying out the study by 4 March,
- c Submission of a detailed draft outline of the study components by 4 March,
- d Submission of the country specific Trip Reports upon completion of all field visits o/a 20 March
- e Submission of the Draft Final Report and presentation of key findings and strategic interventions to USAID/RCSA by 20 April, and
- f Incorporation of USAID/RCSA review comments and submission of the Final Report by 31 May

FOLLOW-UP CONSULTATIONS

Any follow-up technical consultations with USAID/RCSA's technical officer, as appropriate, once the study team complete its field work and departs the southern Africa region will be managed from the Washington offices of Coopers and Lybrand's sub-contractor J E Austin Associates.

USAID Southern Africa Regional Highway Management System Study

**ANNEX B:
SATCC TRANSPORT PROTOCOLS**

J E Austin Associates, Inc
June 1998

SADC PROTOCOL ON TRANSPORT, COMMUNICATION AND METEOROLOGY - Transport Component

CHAPTER 2 GENERAL OBJECTIVE AND STRATEGIC GOALS

2.1 GENERAL OBJECTIVE

Member States' general objective is to establish transport, communications and meteorology systems which provide efficient, cost-effective and fully integrated infrastructure and operations which best meet the needs of customers and promote economic and social development while being environmentally and economically sustainable.

2.2 STRATEGIC GOALS

Member States shall engage all stakeholders in giving effect to this Protocol by promoting the following strategic goals:

- Integration of regional transport, communications and meteorology networks to be facilitated by the implementation of compatible policies, legislation, rules, standards and procedures
- Elimination or reduction of hindrances and impediments to the movement of persons, goods, equipment and services
- Broad-based investment to develop, preserve and improve viable strategic transport, communications and meteorology infrastructure within an investor-friendly environment generating adequate returns
- Restructured state enterprises and public utilities which are financially independent and commercially viable
- Optimal utilisation of public and private financial, human and other resources and the effective allocation of existing scarce resources
- Adequate own funding and appropriate supplementary funding, amongst others, through recovery of full costs for maintenance of infrastructure and service provision and progressive recovery of full future costs for infrastructure and service provision and use on an equitable basis
- Regional and global competitiveness of the community's large and small service providers
- Complementarity and economies of scale between the community's service providers
- Co-operative policy development facilitated by strategic partnerships between government and a responsible and competent regional private sector
- Regional development fostered by strategic partnerships between international co-operating partners and regional stakeholders
- Customer-driven service provision characterised by adequate access to basic transport, communications and meteorology services and progressive improvement of service quality
- Improved diversity of services and provision of services on a competitive bid basis through the promotion of fair and healthy competition between service providers in terms of transparent, flexible, predictable and streamlined regulatory frameworks
- Informed decision-making and improved investor confidence to facilitate commercial activity

CHAPTER 4 ROAD INFRASTRUCTURE

4.1 OBJECTIVES

Member States agree to ensure and sustain the development of an adequate roads network in support of regional socio-economic growth by providing, maintaining and improving all roads including primary secondary, tertiary and urban roads, including those segments which collectively constitute the RTRN in order to

- ensure access to major centres of population and economic activity,
- ensure access between ports of entry between Member States and harbours of importance to the region,
- minimize total road transport costs
- preserve assets vested in road infrastructure, and
- minimize detrimental impacts to the environment

4.2 ROAD INFRASTRUCTURE POLICY

In order to attain road infrastructure objectives Member States agree to develop a harmonized regional road infrastructure policy aimed at

- monitoring the adequacy and quality of the regional road infrastructure and the need to mobilize resources to meet the developmental objectives contemplated in Article 1.1 of this Protocol
- introducing commercial management practices to foster institutional economic and technical efficiency in their national roads sectors
- supporting nurturing and co-ordinating their national roads activities to the benefit of the region as a whole
- developing complementary strategies to reduce the cost of constructing and maintaining their respective road networks including consideration of the potential for reducing road financing needs by contracting out all types of road construction and maintenance activities, and
- acknowledging the need of the region for a vibrant, capable, varied and geographically extensive contracting and consulting industry and endeavouring to define and develop the optimal environment for development of the regional contracting industry

4.3 REGIONAL TRUNK ROAD NETWORK AND ROUTE NUMBERING SYSTEM

- 1) Member States shall adopt a common definition of the RTRN and common route numbers, which shall serve as a basis for a co-ordinated plan for the construction and development of roads of regional and continental importance which they intend to undertake within the framework of their national programmes

- ii) Member States agree that the definition of the RTRN will be revised annually

4.4 NATIONAL ROADS AUTHORITIES

Member States agree to establish autonomous accountable national roads authorities which are representative of the public and private sector and which have clearly defined responsibilities for

- a) overseeing, regulating and managing roads on a commercial basis by -
 - i) applying economic criteria in respect of the optimal scope, design and timing for road programmes, and
 - ii) implementing effective performance measurement and independent auditing
- b) effective utilization of funding for roads
- c) promoting the involvement of the private sector road users, local authorities financial institutions and environmental interest groups in the planning, design, construction maintenance operation and financing of roads
- d) promoting competition by introducing competitive terms and conditions in infrastructure planning design construction, maintenance and operation contracts,
- e) developing a transparent process for the awarding of infrastructure contracts contemplated in paragraph (d),
- f) ensuring accountability to stakeholders for the provision operation and management of roads
- g) promoting public awareness on the importance of roads for mobility and trade purposes and engendering the culture of ownership and proper use of roads amongst road users
- h) collaborating with road transport and traffic authorities to strengthen enforcement of road transport and traffic regulations, and
- i) reviewing the classification of national roads systems and the definition of the RTRN

4 5 FUNDING SOURCES

- 1 Member States agree to develop and implement cohesive and definitive road funding policies with a view to
 - identifying adequate sustainable and appropriate sources of road funding which includes general revenue road user charges and funds generated jointly by the public and private sectors,
 - increasing transparency in the road funding process
 - ensuring that revenues obtained from road users under road user charges shall be regarded as dedicated for the provision, maintenance and operation of roads,
 - ensuring that road users including foreign road users, contribute to the full costs of maintaining roads and progressively contribute to the full costs of providing roads while
 - ensuring that the revenues obtained from foreign road users are devoted to the maintenance of the RTRN within their respective territories
 - ensuring that the use of roads is priced so as to improve economic efficiency in road transport and
 - promoting equity between different categories of road users
 - ensuring that Member States shall apply the principle of non-discrimination in implementing road user charging instruments to foreign road users

- 2 In order to promote harmonized national road user charging systems, Member States shall develop a common understanding in respect of the types of road user charging and the levels of such charges and introduce in their respective territories on the basis of regular exchange of information
 - fuel levies (designated as road charges),
 - vehicle licence fees
 - road tolls
 - abnormal and awkward load charges,
 - weight-distance type charges,
 - cross-border road user charges
 - entry fees payable by foreign registered vehicles and
 - parking and traffic congestion costs

4 6 REGIONAL FUNDING INITIATIVE

- 1 Member States agree to implement harmonized cross-border road user charging systems which shall be regularly reviewed improved and supplemented through improved research and data collection
- 2 Member States acknowledge that national funding may be insufficient to ensure adequate extension, maintenance or improvement of the RTRN and, to this end, agree to encourage, in support of the activities of national roads authorities
 - a) the development of joint regional research and other programmes to assess on a continuous basis the adequacy of road funding in the region,
 - b) the development of transparent comprehensive regional strategies aimed at procuring funding sources which may include the levying of cross-border road user charges and the collective or individual procurement of loans, and
 - c) the establishment of a regional road maintenance fund

4 7 HARMONIZED TECHNICAL STANDARDS

- 1 Member States agree to implement complementary flexible, sustainable affordable appropriate and transparent national road management systems
- 2 Member States agree to develop appropriate harmonized technical standards in respect of amongst others
 - a) infrastructure planning and design standards including land-use planning standards
 - b) soils and materials testing standards and
 - c) road and bridge construction and maintenance contract documentation including general conditions of contract, specifications and standard methods of measurement
- 3 For the purpose of this article, Member States shall ensure that the construction of new roads which will form part of the RTRN and the maintenance of roads which already form part of the RTRN contracted from a date to be agreed upon, shall comply with harmonized minimum road and bridge design standards and specifications
- 4 Member States shall strive to adopt a harmonized position with regard to the construction of new roads which will not form part of the RTRN

USAID Southern Africa Regional Highway Management Systems Study

**ANNEX C:
SATCC REGION VEHICLE OVERLOAD FINES**

J E Austin Associates, Inc
June 1998

OVERLOADING WITH RESPECT TO GROSS MASS (GVM)

Fee schedule				
USD				
Total overload	Fee	Total overload	Fee	
Kilogrammes	USD	Kilogrammes		
500	22	25500	11519	
1000	45	26000	12653	
1500	70	26500	13900	
2000	95	27000	15291	
2500	122	27500	16821	
3000	150	28000	18512	
3500	180	28500	20381	
4000	211	29000	22448	
4500	244	29500	24735	
5000	279	30000	27264	
5500	316	30500	30062	
6000	355	31000	33158	
6500	397	31500 and above	35000	
7000	441			
7500	489			
8000	539			
8500	583			
9000	651			
9500	712			
10000	779			
10500	850			
11000	926			
11500	1009			
12000	1098			
12500	1195			
13000	1299			
13500	1412			
14000	1535			
14500	1668			
15000	1813			
15500	1971			
16000	2143			
16500	2331			
17000	2536			
17500	2760			
18000	3006			
18500	3275			
19000	3569			
19500	3893			
20000	4248			
20500	4638			
21000	5067			
21500	5538			
22000	6057			
22500	6628			
23000	7258			
23500	7952			
24000	8716			
24500	9560			
25000	10491			

Source COMESA Control of Vehicle Overloading Lusaka October 1997

134

FEE SCHEDULE FOR OVERLOADING PER AXLE

Single axle dual wheel				
Legal load per axle 8.0 tonnes				
Overload per axle	Fee per axle	Overload per axle	Fee per axle	
100	4	5100	533	
200	9	5200	522	
300	14	5300	571	
400	19	5400	591	
500	24	5500	611	
600	29	5600	632	
700	35	5700	653	
800	41	5800	675	
900	47	5900	697	
1000	53	6000	719	
1100	59	6100	742	
1200	65	6200	766	
1300	72	6300	790	
1400	79	6400	814	
1500	86	6500	840	
1600	94	6600	865	
1700	101	6700	891	
1800	109	6800	918	
1900	117	6900	945	
2000	125	7000	973	
2100	134	7100	1001	
2200	143	7200	1030	
2300	152	7300	1059	
2400	161	7400	1089	
2500	171	7500	1119	
2600	181	7600	1151	
2700	191	7700	1182	
2800	201	7800	1215	
2900	212	7900	1247	
3000	223	8000	1281	
3100	235	8100	1351	
3200	246	8200	1350	
3300	258	8300	1385	
3400	270	8400	1422	
3500	283	8500	1458	
3600	296	8600	1496	
3700	309	8700	1534	
3800	323	8800	1573	
3900	337	8900	1612	
4000	351	9000	1652	
4100	366	9100	1693	
4200	381	9200	1735	
4300	396	9300	1777	
4400	412	9400	1820	
4500	428	9500	1864	
4600	444	9600	1908	
4700	461	9700	1954	
4800	479	9800	2000	
4900	496	9900	2046	
5000	514	10000	2094	

1) Based on assumed cost of 1.2 US Cent per ESA-kilometer 300 kilometers with overload a factor of punitive and administrative element of 3 and 30% detention of overload vehicles.

Source COMESA Control of Vehicle Overloading Lusaka October 1997

135

FEE SCHEDULE FOR OVERLOADING PER AXLE

Single axle dual wheel				
Legal load per axle 10 0 tonnes				
Overload per axle	Fee per axle	Overload per axle	Fee per axle	
100	8	5100	836	
200	16	5200	864	
300	25	5300	892	
400	34	5400	921	
500	43	5500	950	
600	52	5600	980	
700	62	5700	1010	
800	72	5800	1041	
900	82	5900	1073	
1000	92	6000	1106	
1100	103	6100	1138	
1200	114	6200	1172	
1300	126	6300	1206	
1400	137	6400	1241	
1500	149	6500	1276	
1600	161	6600	1312	
1700	174	6700	1349	
1800	187	6800	1387	
1900	200	6900	1425	
2000	214	7000	1464	
2100	228	7100	1503	
2200	242	7200	1543	
2300	257	7300	1584	
2400	272	7400	1626	
2500	287	7500	1668	
2600	303	7600	1711	
2700	319	7700	1755	
2800	335	7800	1799	
2900	352	7900	1845	
3000	369	8000	1891	
3100	387	8100	1891	
3200	405	8200	1937	
3300	424	8300	1985	
3400	443	8400	2033	
3500	462	8500	2083	
3600	482	8600	2183	
3700	502	8700	2235	
3800	523	8800	2288	
3900	544	8900	2341	
4000	566	9000	2395	
4100	588	9100	2450	
4200	610	9200	2506	
4300	633	9300	2563	
4400	657	9400	2621	
4500	681	9500	2679	
4600	705	9600	2739	
4700	730	9700	2799	
4800	756	9800	2860	
4900	782	9900	2923	
5000	809	10000	2986	

1) Based on assumed cost of 1.2 US Cent per ESA-kilometer 300 kilometers with overload a factor of punitive and administrative element of 5 and 20% detection of overload vehicles

Source COMESA Control of Vehicle Overloading Lusaka October 1997

136

**FEE SCHEDULE FOR OVERLOADING WITH RESPECT
TO AXLE LOAD LIMIT AND GVM**

KILOGRAMS OVERLOAD	FEE ELEMENT FOR PAVEMENT DAMAGE	FEE ELEMENT FOR BRIDGE DAMAGE	TOTAL FEE
500	43	22	65
1000	92	45	137
1500	149	70	219
2000	214	95	309
2500	287	122	490
3000	369	150	519
3500	462	180	642
4000	566	211	777
4500	681	244	925
5000	809	279	1088
5500	950	316	1266
6000	1106	355	1461
6500	1276	397	1673
7000	1464	441	1905
7500	1668	489	2157
8000	1891	539	2430
8500 and above	2986	33158	36144

Notes: This table is compiled from Annexures V and VII

Source COMESA Control of Vehicle Overloading Lusaka October 1997

137

USAID Southern Africa Regional Highway Management Systems Study

**ANNEX D:
REGIONAL ROAD MANAGEMENT
INFORMATION SYSTEMS DATA FORMATS**

J E Austin Associates, Inc
June 1998

Costs-Time

Travel Times and Costs							
Road Transport Costs, 20 Foot Containers							
Costs (\$/container)							
Route	Kilometers	Travel Time, Hours	Road Freight	Insurance	Handling	Border Clearing	Other
Durban Harare							
Dar es Salaam Lusaka							
Beira Blantyre							
Road Transport Costs, Bagged Grain							
Costs (\$/tonne)							
Route	Kilometers	Travel Time, Hours	Road Freight	Insurance	Handling	Border Clearing	Other
Durban - Harare							
Dar es Salaam Lusaka							
Beira Blantyre							
Border Clearing Times							
Clearing Time, Hours							
Route	Beitbridge	Mutare	Zobue	Nakonde	Chirundu	Total	
Durban Harare							
Dar es Salaam Lusaka							
Beira Blantyre							
Durban Lusaka							

Source SATCC/PAAS Maputo March 1988

139

Maintenance and Funding

D1 Road Maintenance and Capital Costs and Funding								
D1 Road User Payments, US\$ Mill (data)								
Funding Source	Receipts	Dedicated to Road fund						
Fuel Levy, Diesel								
Fuel Levy, Petrol								
License fees, regular								
License fees heavy goods vehicles								
Cross Border Transit Fees								
Overload Fines or Fees								
Bridge Tolls								
Road Tolls								
Abnormal Load Charges								
Other								
Total								
D2 Actual Expenditures (data)								
Road maintenance Expenditures	Routine	Periodic	Rehabilitation	Reconstruction	Upgrading	Bridges	Institutional	Total
Regional Trunk Road Network								
Main district and Provincial roads								
Feeder Roads								
Urban Roads								
Total								
D3 Sustainable Expenditures (Calculated using HDM III)								
Road maintenance Expenditures	Routine	Periodic	Rehabilitation	Reconstruction	Upgrading	Bridges	Institutional	Total
Regional Trunk Road Network				Not Applicable				
Main district and Provincial roads				Not Applicable				
Feeder Roads				Not Applicable				
Urban Roads				Not Applicable				
Total				Not Applicable				
D4 Composition of Roads Budget (data)				D5 Summary Sheet for Maintenance Funding				%
Source of Funds	US\$, Mill	%		Proportion of sustainable maintenance expenditures funded by RUC				
General Budget				Proportion of maintenance expenditures covered by road fund *				
Road fund				Proportion of total road works covered by road fund *				
Donors								
Other				Total RUC receipts (Table D1)/Total sustainable expenditures (Table D2)				
Total				Total Road Fund receipts (Table D1)/Total actual expenditures (Table D2)				
				Total Road Fund receipts (Table D1)/Total actual expenditures (Table D2)				

Source SATCC/PAAS Maputo March 1988

User Information

				User Costs and Service Quality (calculated values)		
Average Vehicle Operating costs						
Vehicle Operating Costs \$ million						
Road Class	Actual	Ideal	Avoidable	% difference		
Regional Trunk Road Network						
Main district and Provincial roads						
Feeder Roads						
Urban Roads						
Total						
Average Road service Quality						
Road Class	Road Length kms	Road Space (lane kms)	Average IRI (meters/km)			
Regional Trunk Road Network						
Main district and Provincial roads						
Feeder Roads						
Urban Roads						
Total						
Definitions						
Actual Vehicle Operating Costs (VOC)			VKM on good road x VOC for good road + VKM on fair road x VOC for fair road + VKM on poor road x VOC for poor road			
Ideal Vehicle Operating Costs (VOC)			Total VKM x VOC for good road			
Avoidable VOC			Actual VOC - Ideal VOC			
Road Length			Summation of the length of all the road segments			
Road Space			Summation of the product of road length and number of lanes for each road segment			
Average IRI			weighted average of IRI			

Source SATCC/PAAS Maputo March 1988

141

Infrastructure Summary

Road Inventory Summary calculated values									
	Length by surface cond (lane kms)			Length by shoulder cond (kms)			Length by drainage cond (kms)		
	good	fair	poor	good	fair	poor	good	fair	poor
Regional Trunk Road Network									
Other Main Roads									
Feeder Roads									
Urban Roads									
Calculations based on Data in Sheet #1 (Road Infrastructure)									

Source SATCC/PAAS Maputo March 1988

12/1

Road Infrastructure

Detailed Input Data for Trunk Roads														
Road Inventory														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Regional Trunk Road Code	Link Name (From To)	Pavement Type	Number Of Lanes	Road Length	IRI	Surface Condition Rating	Shoulder Condition Rating	Drainage Condition Rating	Sustainable maintenance cost \$/km	Actual cost spent on maintenance, \$/km	Total Traffic (Aadt)	Date Of Count	% Heavy	% Overloaded
Aggregate Input Data for All Other Roads														
		Total Kilometers	Surface condition rating	Shoulder Condition Rating	Drainage Condition Rating	Sustainable maintenance cost, \$/km	Actual cost spent on maintenance \$/km	Average Traffic						
Other Main Roads and Provincial Roads														
Feeder Roads														
Urban Roads														
Data Input Guide														
Column	Name	Definition												
1	Route Code	Code name of the section as used by the country's inventory control system. For example EN1 for the Mozambique national road from Maputo to Namupa.												
2	Link Name (2)	From town to town as in Road Information Handbook. For example, Ramanabara Border Post to Rukhura Junction												
3	Pavement Type	Paved, gravel, earth												
4	Number Of Lanes	Self explanatory												
5	Road Length	Length in kilometers of the road segment (do not multiply by the number of lanes)												
6	IRI	International Roughness Index, meters/km												
7	Surface Condition Rating	Measured in terms of IRI, measured. Generally good for IRI < 4, "fair" IRI between 4 and 8, "poor" IRI > 8												
8	Shoulder Condition Rating	Measured qualitatively by senior road engineer and classified into good, "fair", and "poor" condition.												
9	Drainage Condition Rating	< 5% blocked by mud, rocks, grass, etc. would be "good", between 5% and 20% would be "fair", and > 20% would be "poor".												
10	Sustainable maint. cost	Anticipated maintenance and rehabilitation cost as derived by HCM III assuming road is in maintainable condition.												
11	Actual maint. cost	Average annual expenditures on routine and periodic maintenance and rehabilitation												
12	Total Traffic (Aadt)	The standard definition of Average Annualized Daily Traffic applies.												
13	Date Of Count	The year the latest estimate of AADT was made.												
14	% Heavy	The percentage of total traffic consisting of heavy buses and goods vehicles with three or more axles.												
15	% Overloaded	The percentage with overloads above the tolerance level												
Notes		1. Each trunk road consists of several links. Each link should be homogeneous with respect to traffic, condition, etc. 2. Each Member State may use their own classification, but must provide a description of that classification so that the SATCC analyst can properly summarize aggregate regional data												

Source SATCC/PAAS Maputo March 1988

USAID Southern Africa Regional Highway Management Systems Study

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145

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152

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USAID Southern Africa Regional Highway Management Systems Study

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161

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162

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**ANNEX G:
TABLES**

J E Austin Associates, Inc
June 1998

Table G 1. Institutional and Regulatory Framework

Country	Institutional Structure	Implementation Status
Angola	Road Fund Road Board Road Agency	Legally established but not implemented Legislation requires strengthening None INEA established as a future agency but no funding Angola not yet committed to the RMI
Botswana	Road Fund Road Board Road Agency	No funding operating but there is agreement in principle to establish one A fuel levy exists Nothing operating but there is agreement in principle to establish a Road Board No commitment An Institutional Study is to be carried out, following internal department studies
Lesotho	Road Fund Road Board Road Agency	Fund established 2/96, to be reviewed during 1998 In the interim, the MoF will be custodian of the fund but an Advisory Road Board is to be set up prior to the establishment of a National Roads Board There is an agreement in principle to establish an autonomous National Road Authority, to be developed during 1998
Malawi	Road Fund Road Board Road Agency	Legally established April 1997 with presidential consent May 1997 Legally established April 1997 with presidential consent May 1997 Board appointed June 1997 Legislation for the National Roads Authority Bill was passed in April 1997
Mauritius	Road Fund Road Board Road Agency	A road fund was set up under regulations in 1990 but lacks a legal framework A fuel levy exists at 1 US cent Yes, with minority private sector participation Under discussion
Moz	Road Fund Road Board Road Agency	A road fund is operating but through the MoF New legislation is expected to be submitted to Cabinet 10/97 A fuel levy exists at 10/7 US Cents (petrol/diesel) An updated Road Act is being drafted which will establish the National Road Administration Parliament expected to approve by end 1997
Namibia	Road Fund Road Board Road Agency	A simulated road fund began operating in 1997 Legislation for the fund complete and is expected to be established by 4/98 A road fund administration and a Board of Directors are to be established with the road agency Legislation for the National Road Authority is complete and it is expected to be established by 4/98

165

Table G.1. Institutional and Regulatory Framework - Continued

Country	Institutional Structure	Implementation Status
South Africa	Road Fund Road Board Road Agency	The National Road Fund is to be re-established as a dedicated fund in conjunction with a National Road Agency Legislation approved 6/97 A fuel levy exists @ 4 US cents The South African Roads Board is established, consisting of 6/6 public/private sector Legislation for a national road agency was approved 6/97, but it is expected to be operational 4/98
Swaziland	Road Fund Road Board Road Agency	There is no formal road fund MoF collects fuel tax and this includes an assumed fuel levy of 1 US cent Establishment of dedicated fund is under discussion and legislation is being developed Only as district level, no private sector participation Legislation is being developed MPWT is planning to create a road agency
Tanzania	Road Fund Road Board Road Agency	Created 5/93 Legislation proved ineffective against raids and requires strengthening Fuel levy was 3 US Cents but is now 15% pump price Exists at central and district level but no control or executive powers The functions of the Central Board are being reviewed Results of study being reviewed - the degree of autonomy of the agency is being discussed
Zambia	Road Fund Road Board Road Agency	Created 5/93 Legislation proved ineffective against raids and requires strengthening Fuel levy was 3 US cents but is now 15% of pump price The National Road Board manages the road fund, with dominant private sector and secretariat Recommendations for fully autonomous road agency was not approved by Cabinet and a revised structure is being considered with NRB responsibilities to a council of ministers
Zimbabwe	Road Fund Road Board Road Agency	The legislation for a dedicated road fund is expected to be passed by the end of 1997 The appointment of the road fund board is expected by 1/98, consisting of 5/5 public/private sector Commitment made for a road agency but structure not yet agreed The ME would be overall National Road Authority

166

Table G 2 Road Networks (Classification)

Country	Primary	Secondary	Tertiary	Total
Mozambique	5,400	10,000	11,000	26,400
Botswana	8,761	NA	9,566	18,327
Namibia	4,253	9,199	49,698	63,250
Zimbabwe	18,460	52,240	15,450	85,488
South Africa	6,141	176,286	258,000	440,427
Tanzania	10,281	17,730	59,989	88,000
Malawi	4,520	2,768	7,306	5,192
Zambia	8,736	28,025	29,239	66,00
Swaziland	1,362	2,534	2,000	4,896
Lesotho	2,169	1,397	1,571	5,137
Angola	30,000	NA	45,000	75,000

Source "SADC Transport Efficiency Project, Road Network Management and Financing," January 1997

Table G.3 Road Conditions

Country	Road Conditions
Mozambique	Very poor with large backlog of rehabilitation Some roads are impassable to normal vehicles
Botswana	Good but impending need for more rehabilitation
Namibia	Good but needs more resealing finance
Zimbabwe	Good but requires more rehabilitation and resealing funding
South Africa	Good but requires more rehabilitation and resealing funding
Tanzania	Except for recently rehabilitated roads, most of the network is in nearly impassable condition
Malawi	60% of the rural roads are badly pot-holed and in poor condition
Zambia	20% good, 40% fair (passable), 40% poor (4x4's only)
Swaziland	54% good, 26% fair, 17% poor
Lesotho	80% of paved road very good, 20% fair, gravel good to poor
Angola	Very poor condition, high percentage impassable

Source "SADC Transport Efficiency Project Road Network Management and Financing." January 1997

Table G 4. Road Management and Finance Data Summary

Country	Area km 1000	Population		GDP US\$B	Roads 1000 km				Staff		Expenditure 1995/96 US\$M			Road Condition			Vehicles 1000
		People (mil)	Vehicles 1000		Paved	Gravel	Earth	Total	E	T	Recurr	Cap	Total	G	P	I	
Moz	802	16 5	53	1 0	5 4	10	11	26 4	15	20	200		200	10	40	53	
Bots	582	1 4	109	3 9	3 7	3,6	11	18 3	32	103			32	100	-	-	110
Nam	824	1 5	152	2 4	4 6	26	32	62 5	226	10			67	100	-	-	152
Zimb	391	10 4	438	5 9	11 9	44	29	85 5	66	176			32	100	-	-	438
South Africa	1,221	42	6,340	1063 0	57 0	346	-	450 7	53	678			116 (593)	100	-	-	6339
Tanz	945	26 0	107	2 9	3 3	9 3	75 3	88	261	524	37	50	87	40	30	30	106
Malawi	118	9 1	50	1 9	2 8	4 4	7 3	14 6	13	35	28	-	28	30	30	30	50
Zambia	752	8 3	129	2 9	6 5	2,3	57	66	21	29	43	-	43	20	40	40	129
Swaz	17	0 8	70	0 9	0 8	2 1	-	2 9	11	38	6	25	31	54	17	17	70
Les	30	1 9	29	1 12	0 9	3 0	1,2	5 1	20	72	12	11	23	40	10	10	29
Angola	1,247	9 7	57	7 2	8 2	4 0	62 8	75 0	-	5							57

Road Condition

- G = Good (i e , drive at normal speeds with comfort)
- P = Passable to normal vehicles but in bad condition (pot-holes, etc)
- I = Impassable to normal vehicles (4x4's only or heavy vehicles)
- () South African Provinces

Except in South Africa, AASHO services levels do not apply as traffic volume is too low to produce flow capacity problems
 The number listed for South African Staff is only for the 6000 km of national roads

Source "SADC Transport Efficiency Project, Road Network Management and Financing," January 1997

Table G.5: Road Traffic Accidents in SADC Countries

Country	Year	Pop'n	Vehicle Fleet	Vehicle per 10,000 pop'n	Total Number of Accidents	Injuries	Fatalities	Casualties = Injuries + Fatalities	Fatalities per 10,000 Vehicles
Angola	89 93	8 0 9 7	57,000	59		0 0			
Botswana	89 93	1 2 1 4	64,301 101,031	536 722	5,741 9,163	2,661 5,136	262 379	2,923 5,515	41 38
Lesotho	89 93	1 9	25,471	134	2,196	0 4,252	1,092	5,344	194
Malawi	89 93	16 5	56 400	62		4,252	1,092	5,344	194
Mozambique	89 93	16 5	37,000	22	5,260	0 5,777	961	6,738	260
Namibia	89 93	1 5	138,005	920	6,021	0 0	102	102	-
South Africa	89 92	41 7	5,960,836 6,341 605	1,521	429,485	83,804	10,142	93,946	16
Swaziland	89 93	0 8	51,435 65,038	813	3,220	0 1,414	233	1,647	36
Tanzania	89 93	25 9	265,000	102	9 538 12, 595	9,283 11,513	1,256 1,483	10,539 12,996	56
Zambia	89 93		8 3	110,000	133	4,680 5,274	850 830	5,530 6,104	75
Zimbabwe	89 93	10 4	381,186 423,551	407	20,899 25 917	11,105 13,948	1,022 1,024	14,972	27 24

Source "Transport and Communications Analysis, Transport and Communications Integration Study for Southern Africa, Volume 2 Draft Final Report "

Table G 6. Trade of SADC Countries with South Africa in 1993

Country	Total Imports	Imports from RSA	Total Exports	Exports from RSA	Imports from RSA as % Total	Exports to RSA as % Total
Angola	2,583 0	58 1	3,113,0	0 1	2 2	0 0
Botswana	1,458 0	980 0	1,725 0	206 1	67 2	11 9
Lesotho	852 0	712 0	121 0	55 9	83 6	46 2
Malawi	544 0	181 6	319 0	48 8	33 4	15 3
Mauritius	1,717 0	259 5	1,331 0	6 6	15 1	0 5
Mozambique	855 0	280 5	132 0	18 6	32 8	14 1
Namibia	1,143 0	1,057 2	1,146 0	360 0	92 5	31 4
Swaziland	815 0	714 9	673 0	422 9	87 7	62 8
Tanzania	1,517 0	17 9	488 0	6 7	1 2	1 4
Zambia	774 0	293 9	1,134 0	12 4	38 0	1 1
Zimbabwe	1,843 0	535 0	1,490 0	203 3	29 0	13 6
Total	14,101 0	5,090 6	11,672 0	1,341 7	36 1	11 5

Reminder Recorded Trade only

Source SITC, African Development Indicators, 1996 (World Bank)

Volume 2 Main Report Trade Analysis

Table G 7 Intra-SADC Trade (other than with South Africa) in 1993
(US\$million, percent)

Country	Exports to SADC Countries	Imports from SADC Countries	Exports to SADC Countries as % of Total Exports	Imports to SADC Countries as % of Total Imports
Angola	1 9	0 0	0 1	0 0
Botswana	84 9	116 4	4 9	7 9
Lesotho	1 1	1 1	0 9	0 1
Malawi	5 6	49 3	1 8	9 1
Mauritius	13 3	13 0	1 0	0 8
Mozambique	11 3	139 5	8 6	16 3
Namibia	275 5	32 2	24 0	2 8
Swaziland	58 4	100 0	8 7	12 3
Tanzania	27 0	41 7	5 5	2 7
Zambia	36 7	62 5	3 2	8 1
Zimbabwe	168 1	129 0	11 3	7 0
Total	683 8	683 8	5 9	4 8

Source SITCD, African Development Indicators, 1996 (World Bank)
Volume 2 Main Report, Trade analysis

Table G 8 Annual Flow of LGV and HGV Across SADC Borders

Origin	Number of Vehicle Crossings (000)	Percent
South Africa	500 7	44 2
Lesotho	173 5	15 3
Botswana	122 2	10 8
Swaziland	120 3	10 6
Zimbabwe	81 9	7 2
Namibia	54 3	4 8
Mozambique	29 9	2 6
Zambia	26 1	2 3
Malawi	10 6	0 9
Tanzania	6 0	0 5
Angola	5 0	0 4
Others	3 0	0 3
Total	1,133 7	99 9

Source "Transport and Communications Integration Study for Southern Africa, Traffic and Traffic Forecasting,"
Volume 2 Main Report

Table G.9: Annual International Highway Freight Movements 1996 (000 tonnes)

	Country of Destination												
	Angola	Botswana	Lesotho	Malawi	MOZ	Namibia	South Africa	Swaziland	Tanzania	Zambia	Zimbabwe	Other	Total
Country of Origin													
Angola	87	-	-	-	-	158	-	-	-	-	-	-	245
Botswana	-	29	-	13	-	98	1447	08	15	322	108	-	2041
Lesotho	-	09	90	03	-	-	1401	01	-	-	-	-	1504
Malawi	-	05	-	13	810	-	671	-	158	121	1569	03	3350
Mozambique	-	-	24	1644	56	08	318	54	-	106	794	26	3030
Namibia	531	183	-	-	-	19	4261	14	-	419	167	-	5594
South Africa	25	12186	8669	550	1158	5605	113	6254	01	177	4609	1358	42298
Swaziland	-	19	06	-	304	08	4418	01	-	-	07	-	47633
Tanzania	-	-	-	705	-	-	-	-	-	514	-	35	1254
Zambia	-	17	-	433	682	104	776	-	634	66	398	2	3130
Zimbabwe	03	513	14	2997	395	429	4039	-	06	2121	26	211	10754
Other	-	05	-	08	07	12	210	-	52	19	28	0	341
Total	645	12966	8804	6395	3412	6442	17654	6331	866	5459	7706	1653	78059

Source: SATCC Cross-Border Survey

Table G 10· Forecast Total Regional Cross-Border Traffic Volumes (1995-2017)

<i>Market/Scenario</i>	<i>1995</i>	<i>2002</i>		<i>2007</i>		<i>2017</i>	
		<i>Volume</i>	<i>% Growth from 1995</i>	<i>Volume</i>	<i>% Growth from 1995</i>	<i>Volume</i>	<i>% Growth from 1995</i>
<i>Freight (m Tonnes)</i>							
<i>Actual</i>	15 4	-		-		-	
<i>Medium Growth</i>	-	21 6	40 3	26 5	72 1	39 6	157 1
<i>Medium Growth +2%</i>	-	24 6	59 7	33 0	114 3	59 6	287 0
<i>Passenger</i>							
<i>Car</i>	3 6	5 5	52 7	6 7	88 2	10 7	199 2
<i>Bus</i>	2 1	2 9	35 8	3 4	59 9	4 9	130 2
<i>Rail</i>	0 4	0 6	56 4	0 7	74 4	0 9	123 1

Source Transport and Communications Integration Study for Southern Africa, Traffic and Traffic Forecasting,” Volume 2 Draft Final Report