Assessment of the Administrative Process in the Management of Maintenance Project Execution on Trunk Roads

(A Case Study of Ghana Highways Authority (GHA), Volta Region)

By

Abu Mohammed
(PG 2018308)

A thesis Submitted to the Institute Of Distance Learning, Kwame Nkrumah University of Science and Technology in Partial Fulfillment of the requirement for the Degree of

COMMONWEALTH EXECUTIVE MASTERS OF BUSINESS ADMINISTRATION

September, 2012

DECLARATION

I hereby declare that this submission is my own work towards the Executive Masters of Business Administration and that, to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

Mohammed Abu (PG 2018308) …….

Signature Date

Certified By:

S.K. Enninful ……..

Signature Date

Certified By: ……

Prof. I.K Dontwi Signature Date

Dean, IDL

DEDICATION

This work is dedicated to my **wife and children** who through their understanding, has given me enormous support throughout my two years at the Kwame Nkrumah University of Science and Technology.

ACKNOWLEDGEMENTS

I wish to thank the Almighty Lord for making it conceivable for me to undertake this research work. My deepest appreciation goes to my supervisor Mr. S.K.Enninful and Mr. Jude Adjoe for their diligent effort in instructing and guiding me throughout the writing of this research work.

I extend my warmest gratitude to Mr. Ben Honyenugah for the care and assistance he gave me throughout the writing of this project.

Again, I express my appreciation to Mr. Richard Ahedor for his support in editing this research work.

Finally, I wish to express my sincere thanks to all those names I cannot mention especially those who helped me in one way or the other; I will say may God bless you all.

ABSTRACT

This research work was done in partial fulfilment for a Degree. The research objective was to assess the administrative processes employed in the management of maintenance project execution on trunk roads and the Ghana Highway Authority, Volta Region was used as a case study. It also tried to identify the challenges confronting the GHA in the maintenance of road projects. A field targeted investigation was adopted. Field data on user perceptions were sampled using administered questionnaires among GHA employees in the Volta Region. The sample population were the entire GHA staff in the Volta region but a sample size of thirty (30) was chosen for the study. This was because a judgmental sampling technique was used to select staff members who play various roles in maintenance project execution in the Region. The findings reveled that, GHA to a large extent, follow some bureaucratic processes as a public organization in the management of maintenance projects. However, most of the personnel directly involved in the management of maintenance projects are of the view that projects are executed without fixed completion dates and cost which seem very unusual. Probably, the long delays experienced in execution of maintenance projects coupled with extension of time and their attendant cost may justify their perception and GHA much work to change that perception. Furthermore, it is recommended that the road agencies in general needs to be mindful of the control of time and cost in their management of projects to improve the confidence that the workers and the entire public have in them.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figure **Page**

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Road transport is by far the dominant carrier of freight and passengers in Ghana's land transport system. It carries over 95% of all passenger and freight traffic and reaches most communities, including the rural poor (National Transport Policy, 2008). Maintenance of transports assets is critical to achieving desired accessibility, affordability, reliability and safety.

Ghana's road network was about 38,000 kilometres in 2000, since then there have been rapid increases to 49,000 kilometres in 2001 and to 60,000 kilometres by the end of 2005 (National Transport Policy, 2008). Improvements in road condition have been gradual. For example, the road condition in 2004 was 36 percent good, 36 percent fair, and 28 percent poor as compared to the desired condition of 70 percent good, 20 percent fair, and not more than 10 percent poor (National Transport Policy, 2008). The rapid increase in road length has stretched resources for maintenance without necessarily improving accessibility, reliability and affordability. Deferred maintenance of roads also has cost implications. Apart from increasing vehicle operating cost to service providers, rehabilitation cost to government could be as much as 8 – 10 times when carried out at a future date. Improvement in road condition could be achieved through planned expansion of the network, effective maintenance and financial management and improvement in the local construction industry.

Road maintenance is essential in order to preserve the road in its originally constructed condition, protect adjacent resources and user safety, and provide efficient, convenient travel along the route. Unfortunately, maintenance is often neglected or improperly performed resulting in rapid deterioration of the road and eventual failure from both climatic and vehicular use impacts (Caruthers et al 2008). It follows that it is impossible to build and use a road that requires no maintenance.

In order to plan for road maintenance needs, it is important to keep a complete set of "as built" plans and records of all maintenance operations and observations. The as built plan includes complete job index, complete history of project from planning stage to construction, photographic records, exact location and observations of any unstable conditions in relation to the road location, exact location of culverts and other drainage features, wet areas that may have required additional excavation and replacement with more suitable ballast backfield materials and all major changes made to the original plan (Kumar, 2006). Probably the most valuable tool for any maintenance program is the knowledge and experience gained by individuals performing the maintenance. Every effort should be made to retain competent, knowledgeable, and experienced individuals in these positions not only from the standpoint of instituting and executing a good maintenance program, but for future road planning needs as well.

Trunk roads in Ghana constitute the main highways, and they are developed, managed and maintained by the Ghana Highway Authority (GHA). The GHA Maintenance Department has responsibility for the maintenance of all National, Inter Regional and Regional roads in the network. The major role of GHA in meeting the objectives of the current policy on maintenance

work execution is, therefore, supervisory (Addo, 2000). Over the years, Ghanaians have depended on the benevolence of foreign countries who tax their citizens to furnish aid for road financing and it was time to raise funds from internal resources as aid inflows are diminishing. The efficient delivery of road infrastructure services in Ghana is seriously constrained by the government's inability to generate adequate funds, especially from domestic sources. It appears successive governments had difficulty doing this due to a combination of factors-lack of political will, ambivalence, political expediency, weak capacity and lack of independence of the Road Fund Board.

The main sources of financing road development and maintenance are the Road Fund, the Consolidated Fund and development partners (Kumar et al 2007). Development partners like the World Bank, European Union, African Development Bank and other bilateral agencies have over the last decade financed about two-thirds of the total annual $350 million cost of road infrastructure—about $200 million annually—while the Government, under the Road Fund and the Consolidated Fund picked up the remaining $150 million.

It would be simple to say that the problems of lack of maintenance are caused by a lack of understanding of the need for maintenance. However, there are many examples of effective maintenance systems being put into place prior to the growth of the rural road networks in the 1980s and early 1990s. A considerable body of knowledge existed on the benefits of effective maintenance. As early as 1988, the World Bank asserted that one dollar spent on maintenance will save four spent on rehabilitation (Ankrah, 2000). The road maintenance crisis for the major road network was therefore highlighted already in the late 1980s. In Africa this lead to a major

programme called the Road Maintenance Initiative which was primarily concerned with raising awareness of the issue and providing support to national programmes.

A recent International Labour Organisation (ILO) study in Madhya Pradesh also illustrated the ambiguity caused by a lack of foresight in devolving road maintenance responsibilities. The study pointed out that the spread of responsibilities for rural road maintenance within the various levels of government has lead to a situation where no one agency feels responsible for sustaining the rural road network. The study showed that very little road maintenance has been possible due to lack of funds and a lack of proper policy and institutional framework. However, weaknesses in the implementation capacity coupled with the lack of clarity of the institutional responsibilities are hidden as the emphasis has been placed on the inadequacy of funds. While the need for adequate funds is evident it is the more critical institutional issues which require attention (Stock, 2006).

Road maintenance in Ghana is organized according to the different categories of management functions and covers planning, work execution and control, reporting and payment processing. The field control of maintenance works becomes the responsibilities of the Works Supervisor, the Road Area Manager, the Road Maintenance Manager, the Regional Highway Director and the Support Team as far as operation of maintenance is concerned (Ghana Road Fund, 2001). The Project Management Body of Knowledge (PMBOK), a collection of processes and knowledge areas generally accepted as best practice within the project management discipline, recognises initiating, planning, executing, monitoring and controlling, and closing as the basic process typical of almost all projects be it construction, software, engineering, automotive etc.

General management also includes planning, organising, staffing, executing and controlling the operations of an organisation. Financial forecasting, organisational behaviour and planning techniques are also similar.

1.2 Statement of the Problem

Roads in Ghana are administered by the Ministry of Roads and Highways (MRH) through three agencies namely - Ghana Highway Authority (GHA), Department of Feeder Roads (DFR) and the Department of Urban Roads (DUR). The GHA is responsible for planning, development, maintenance and administration of the trunk road network and related facilities in Ghana. It has been transformed from a predominantly force account organization to one which is seeking to execute almost all maintenance work by contracting (GHA, 2001). It is obvious that the success of maintenance project would depend on the level of commitment displayed by both the contract awarding and executing bodies. Both parties would need each other's cooperation in terms of understanding what it takes the other to successfully complete the contract. Successful maintenance project could be achieved depending on the level of adherence to the different categories of the management functions into which each maintenance project is organized (GHA, 2001).

A recent study by Harral and Faiz (2005) showed that very little road maintenance has been possible due to lack of funds and a lack of proper policy and institutional framework. However, weaknesses in the implementation capacity coupled with the lack of clarity of the institutional responsibilities are hidden as the emphasis has been placed on the inadequacy of funds. While the need for adequate funds is evident it is the more critical institutional issues which require

attention (Ashong, 2004). This statement also informed the researcher to go into the administrative processes in the management of road maintenance in the GHA instead of going into financial aspect of maintenance.

The majority of road users are commuters travelling between the two cities for work, trading, agricultural activities and those seeking social services such as education and medical services. Administrators and social workers will also make use of the road to provide extension and outreach services. Notable impacts on the beneficiaries through the management of maintenance project execution on roads will include increased economic activities due to improved transport services with reductions in the cost of transport, travel time and improved road safety and ultimately improve the living standards of the communities in the zone of influence. There will be additional benefits from the project through acquisition of jobs during construction and obtaining sub-contracts for supply of goods and services. The communities along the road will also benefit from road safety awareness and campaigns. Consequently, this study seeks to assess the administrative process in the management of maintenance project execution on trunk roads in the Volta Region.

1.3 Objectives of the Study

The research has the following objectives:

- To determine whether there are administrative processes that is followed in the management of Road projects in the GHA, Volta Region.
- If there is, what are those administrative and managerial processes used by GHA for the maintenance of road projects

- To identify challenges confronting Ghana Highway Authority (GHA), Volta Region in the maintenance of road projects.

1.4 Research Questions

The study examined the following research questions:

i. Are there any administrative processes used to help manage road projects by the GHA, Volta Region?

ii. What are those administrative processes used in the management of road projects in the GHA, Volta Region?

iii. What challenges confront Ghana Highway Authority (GHA), Volta Region in the maintenance of road projects?

1.5 Significance of the Study

In view of increasing recent experience with the implementation of maintenance project execution on trunk roads, the Ghana Highways Authority, Volta Region is devoting more attention at this time to assessing the results of experience and drawing lessons learned for the future. The findings of this study are expected to result in conclusions to be widely shared among Ghana Highway Authority (GHA) regional offices and other interested stakeholders and in recommendations for future action to be debated among the same parties.

This study is significant to support commercialization of road management by increasing domestic resources made available to road maintenance and by increasing the efficiency of

resource use. Many scholars have studied project execution on trunk roads, however very few have steered their direction to pursuing studies in administrative process in the management of project execution on trunk roads within the various regions of Ghana. This study attempts to fill the research gap in that sense and provide understanding on the impact of assessing the administrative process in the management of maintenance project execution on trunk roads.

The research results and recommendations made will serves as a tool for the management of maintenance project execution on trunk roads for the Ghana Highways Authority (GHA) for enhancing marketing activities in order to improve the company's profitability. The research would also invite attention of Ghana Highways Authority and other road construction companies in Ghana on the importance of effective assessment of the administrative process in the management of maintenance project execution on roads.

1.6 Organization of the Study

The study has been organized into five main chapters and each dealt with specific issues as follows:

The first chapter dealt with the introduction of the study. It highlighted the purpose of the study, objectives of the study, research questions, significance of the study and scope and limitations of the study. The second chapter deals with the literature review. It highlighted existing literatures on the subject obtained from journals, annual reports and academic publications which was the basis of the secondary sources of data. It also tried to define some key concepts and ideas of the study. Chapter three covered the study methodology. It dealt with the instruments used in gathering data for the study. It included inquiries, interviews and administering of questionnaires

which formed the basis of the primary data. Chapter four dealt with the analysis and discussion of data collected. Chapter five looked at the summary, conclusions and recommendations of the study. Indeed, this chapter presented suggestions and recommendations to improve efficiency in the management of maintenance project in GHA.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The relevant pieces of information by various sources of authorities reviewed for the purpose of this study were organized in this chapter. The areas reviewed included definition of management, management functions and evolution of management theories. Also are public and private management, maintenance and assets management, comprehensive planning organizational support and overview of road maintenance.

2.2 Definition of Management

Management is the art, or science, of achieving goals through people. Since managers also supervise, management can be interpreted to mean literally "looking over" – i.e., making sure people do what they are supposed to do. Managers are, therefore, expected to ensure greater productivity or, using the current jargon, 'continuous improvement' (Heggie, 2002).

More broadly, management is the process of designing and maintaining an environment in which individuals, working together in groups, efficiently accomplish selected aims (Koontz and Weihrich 1990). In its expanded form, this basic definition means several things. First, as managers, people carry out the managerial functions of planning, organizing, staffing, leading, and controlling. Second, management applies to any kind of organization. Third, management applies to managers at all organizational levels. Fourth, the aim of all managers is the same – to create surplus. Finally, managing is concerned with productivity – this implies effectiveness and

efficiency. Thus, management refers to the development of bureaucracy that derives its importance from the need for strategic planning, co-ordination, directing and controlling of large and complex decision-making process. Essentially, therefore, management entails the acquisition of managerial competence, and effectiveness in the following key areas: problem solving, administration, human resource management, and organizational leadership (Heggie, 2002).

For the GHA, Volta Region, management simply means planning with the little resources available to ensure that the roads are kept in a safe and motorable conditions at all times.

2.3 The Evolution of Management Theory

Management theory provides a simple conceptual framework for organizing knowledge and for providing a blueprint for action to help guide organizations toward their objectives. Contributions from past industrialists have moulded the organizational system and culture, and managers can benefit from an awareness of these contributions. As such, scientific management can be seen as the starting point from where the managerial aspect of organizations are systematically being analyzed and improved for practical application in the day to day running of organizations (Kumar et al 2007). As with any modern theory, scientific management theory is also subject to criticism and has evolved with time to suit the needs of organizations and the environments they are operating in. This is the crucial factor for survival, being able to adopt and adapt to the needs of the surroundings, without foregoing the basic or fundamental structural beliefs of the concept or notion being uphold. Following Sheldrake (2003), Cole (2004) and DuBrin (2006), an overview of the management theory evolution is anchored on several approaches and perspective, namely: i) the classical approach, ii) the human resource approach,

iii) the quantitative approach, iv) the systems perspectives, v) the contingency approach, and vi) the information technology approach (Raduan et al., 2009).

2.3.1 The Classical Approach

The classical approach to management encompasses scientific management and administrative management. The scientific management is the application of scientific methods to increase individual workers' productivity, mainly developed by Taylor, Gantt and Frank & Lillian Gilbreth. On the other hand, the administrative management was concerned with the use of management principles in the structuring and managing of an organization, primarily contributed by Fayol and Weber (Larcher., 2008).

2.3.2 The Human Resource Approach

The human resource approach very much applied the psychological aspect of human nature to manage organizations, i.e. it emphasizes managing people by understanding their psychological makeup and needs. Among the major contributors to this approach are the Hawthorne studies or effect (the phenomenon in which people behave differently in response to perceived attention from evaluators), McGregor's Theory X and Theory Y (assumptions about human nature with regards to work and responsibility), and Maslow's hierarchy of needs (ranging from basic needs to those for self actualization). The human resource management (HRM) and organizational behaviour (OB) theories very much stems from this approach. (Larcher, 2008).

2.3.3 The Quantitative Approach

This approach is a perspective on management that emphasizes the use of a group of methods in managerial decision making, based on the scientific method. This approach is referred to as management science and/or operations research, which adopted quantitative tools including

statistics, linear programming, decision trees, and network analysis. Among the managerial applications are those of inventory control and quality control (Larcher, 2008).

2.3.4 The Systems Perspective

This perspective adopted the view that an organization is a system, or an entity of interrelated parts. Among the management theories applicable from this view is the HRM & OB (including that of organization theory - domestic, international, & virtual enterprises), resource-based view (RBV) (the theory of competitive advantage), strategic management (SM) theories of competitive advantage and collaborative advantage (including that of industrial-organization [I/O] perspective), and competence and innovation (C & I) theory. The systems perspective is vital since the interaction and interlinking of internal resources, capabilities and systems very much explain the dynamism and adaptive nature of organization towards its environment (Larcher, 2008).

2.3.5 The Contingency Approach

This is a perspective on management that emphasizes that no single way to manage people or work is best in every situation. It encourages managers to study individual and situational differences before deciding on a course of action. The management theories that are applicable from this view are strategic management (SM) theories of competitive advantage and collaborative advantage (including that of industrial-organization [I/O] perspective), and competence and innovation (C & I) theory. This is due to differing environmental and organizational needs and structures that affect an organization, coupled with differing resources and capabilities pertaining to individual organization (Larcher, 2008).

2.3.6 The Information Technology Approach

This approach stems from the impact of information technology and the internet on the conduct of organizations, managers and workers alike. Among the management theories applicable from this view are technology and knowledge management (KM) theories, supply chain management (SCM) [including the logistics, distribution and inventory theories], and strategic management (SM) theories of competitive advantage and collaborative advantage (including that of industrial-organization [I/O] perspective). This is also due to the impact of information technology on the conduct of organizations with regards to KM, SCM, and SM, and also the managerial evolution and revolution in response to dynamic environmental changes that are taking place. (Larche, 2008).

2.4 Public and Private Management

Nyangaga (2001) reported that in transacting business, the government's objective is not usually the acquisition of gain but the furtherance of the welfare of the community. This is the great distinction between public and private business. At a more subtle level, the grant to the administration of enormous discretionary powers means that there has been a continuous attempt on the part of the people to control the discretion of the administration in the exercise of the sovereign powers of the state. Pinelo et al (2003) added that the consideration that the principle of consistency, say equity, governs public administration to an extent not observed in business administration.

The basic elements of the argument that public and private management are fundamentally unalike in all important respects are: (1) that the public interest differs from private interests, (2)

that public officials, because they exercise the sovereign power of the state, are necessarily accountable to democratic values rather than to any particular group or material interest, and (3) that the constitution requires equal treatment of persons and rules out the kind of selectivity that is essential to sustaining profitability. Moreover, the extent of the differences between the two sectors has been well documented empirically (Frost, 2001).

Some will argue nonetheless that an enumeration of such differences is misleading because it obscures important similarities. 'All organizations are public,' argues Brushett (2004), by which he means that all organizations, whether governmental, for-profit, or non-profit, are affected to at least some degree by political authority. Thus, he argues, 'public managers can be found in almost every type of organization' because public managers are not limited to government employees but encompass 'persons who manage public' in any sector. However, one might also argue the converse, which all organizations are 'private' to the extent that they are responsible for tasks that are performed by experts who are governed by professional or technocratic authority rather than by stakeholder interests. These tasks were first recognized by Frost, (2001) as 'the semi-scientific, quasi-judicial, and quasi-business or commercial' functions of administration, although 'the expert may come to believe that his science justifies exceeding his authority' a pervasive danger in all organizations requiring specialized expertise (Larcher, 2008).

The distinction between public and private management, then, is arguably definitive from structural, craft, and institutional perspectives. The two sectors are constituted to serve different kinds of societal interests and distinctive kinds of skills and values are appropriate to serving these different interests. The distinctions may be blurred or absent, however, when analyzing particular managerial responsibilities, functions, and tasks in particular organizations. The

implication of this argument is that lesson drawing and knowledge transfer across sectors is likely to be useful and should never be rejected on ideological grounds (Kumar 2006).

2.4.1 Public Management as Structure

According to (Potter, 2007), the earliest conception of public management was as a structure of governance, that is, a formal means for constraining and overseeing the exercise of state authority by public managers. From a structural perspective, public management involves two interrelated elements: lawful delegation of authority and external control over the exercise of delegated authority. The design of arrangements that balance these elements constitutes the paradigmatic problem of public management viewed as a structure of governance.

Heggie (2004) asserted that a large discretion must be given to the administrative authorities to adapt many general rules of law to the wants of the people. He noted further that while the main duty of the executive is to execute the will of the legislature as expressed in statutes, there is a realm of action in which the executive authority possesses large discretion, and that it looks for its authority not to the legislature but to the constitution. Kumar (2004) asked if the main purpose of administrative agencies is to adjudicate according to rules, will we not have abandoned the characteristic and special advantage of a system of administrative justice, which consists in a union of legislative, executive, and judicial functions in the same body to secure promptness of action, and the freedom to arrive at decisions based on policy? Discretion must be controlled, however, and thus a second challenge arose: ensuring adequate legislative, judicial, and public oversight of public management. As legal scholar Ernest Freund put it, 'increased administrative powers call for increased safeguards against their abuses, and as long as there is the possibility of

official error, partiality of excess of zeal, the protection of private right is as important an object as the effectuation of some governmental policy' (Frost, 2001). White (1926) explored the problem of 'control of the administration' at length in his book. 'The problem,' he argued, has gradually developed into that of finding means to ensure that the acts of administrative officers shall be consistent not only with the law but equally with the purposes and temper of the mass of citizens. Perhaps there is no single problem in public administration of moment equal to the reconciliation of the increasing dependence upon experts with an enduring democratic reality' (Gyamfi et al 2002).

2.5 Project Maintenance Management

According to (Larcher, 2008), maintenance is defined as "any activity carried out on an asset or system in order to ensure that it will continue to perform its intended functions". Maintenance activities can be technical or administrative in nature, and they include any effort to protect, preserve, or prevent a system from decline (Gwilliam & Kumar, 2003). Regardless of construction and durability, all buildings, equipment, and infrastructure require responsible operation and some amount of periodic maintenance; failure to perform intended maintenance will shorten the operating life of these assets (Gyamfi et al., 2002).

In many maintenance organizations, daily activities are often dominated by unplanned events (Ankrah, 2000). However, organizations rarely have adequate resources to address all unplanned events and perform all scheduled maintenance actions on infrastructure and equipment assets. Scheduled maintenance that goes uncompleted is known as deferred maintenance. In addition to the sum of all maintenance deficits, deferred maintenance also includes the compounding

negative effect on the assets (Addo, 2000). Accumulation of deferred maintenance can eventually destroy a maintenance operation when the resources required to meet the maintenance deficit become greater than the resources available for the entire maintenance operation (Kumar et al, 2007). Furthermore, as deferred maintenance accumulates, unplanned maintenance requirements increase and further expand the overall maintenance deficit and risk of premature system failures (Vanier, 2001). In order to avoid the serious threats of deferred maintenance, organizations rely on the study and application of maintenance management.

Boarnet (2005) indicates that the primary conflict facing managers of maintenance operations is the struggle of maximizing equipment availability while minimizing resource expenditures Additionally, project maintenance operations are often constrained by external factors and increasing maintenance resources is rarely an option (Zietlow, 2003). Since maintenance consists of many different activities, management gets increasingly difficult as the scope of maintenance operations grows. In an attempt to combat these challenges, organizations have turned to the study of project maintenance management, which focuses on reducing the adverse effects of breakdown and maximizing facility availability at minimum cost while operating within environmental constraints.

Competent and effective project maintenance management will have a direct, positive impact on the profitability and reputation of any organization (Heggie et al, 2002). There are four primary objectives of maintenance management – system function, system life, safety, and what is known as ‘human-well being’ (Zietlow, 2008). The first objective, system function, refers to ensuring an equipment asset or production system is reliable, available, efficient, and capable of serving its

intended purpose. Next, system life refers to managing the system as an asset and keeping it in proper working condition. The third objective, safety, focuses on ensuring risks are kept within acceptable limits and/or meet statutory requirements.

Last, 'human well-being' refers to fulfilling a psychological need that has no direct fiscal or technical necessity.

Project maintenance management programs can vary greatly depending on the context of the maintenance operation (Harral et al., 2005). There are three primary factors that determine the context: the characteristics of the system being maintained, the goals of the maintenance managers, and the scope of the maintenance operation. System characteristics include such factors as the type, age, and operating hours of the equipment. Goals are the intended outcomes of the maintenance operation and can focus on various aspects such as minimizing costs, maximizing effectiveness, or avoiding breakdowns. Scope refers to the size of the maintenance operation and the type of intervention that will occur on the system. There are two types of interventions – minimal repair and preventive maintenance. Minimal repairs take place when failures occur, while preventive maintenance is performed according to a pre-determined schedule (Zietlow, 2008).

2.6 Asset Management in Road Project Execution

Asset management is defined as a systematic process to optimally assess, allocate, and manage natural and built assets and their associated performance, risk, and expenditures over their life cycles in order to support missions, achieve organizational goals, and meet future requirements (Liautaud, 2001). Furthermore, asset management in road project execution provides

organizational leadership with a "decision-making tool that supplies information to take action on decisions such as how and when to acquire, maintain, operate, rehabilitate and dispose of or replace assets in road construction projects" (Stock, 2006). Asset management and maintenance management are highly interrelated concepts which are both concerned with making decisions that drive facility operability and consider its effect on the organizational mission especially in road construction companies

The next section of the literature review explains the concept of asset management. This concept is highly relevant to this thesis because it provides managers with the necessary insight and tools to incorporate numerous considerations when developing a maintenance strategy. Organizations that have infused asset management into their culture and operations have benefited from its many advantages. One such advantage is that it helps to integrate information across multiple spectrums (Liautaud, 2001). Similarly, asset management forces organizations to plan and evaluate decisions from a 'holistic' view, which includes all of an organization's assets instead of just portions or sections (Starkey et al, 2002).

Asset management also helps eliminate functional stove-pipes and encourages integration in all aspects of an organization (Larcher, 2008). These advantages are particularly useful during strategic planning because they help ensure all assets are considered, utilized, and integrated in a manner that eliminates all conflicts and overlaps, such that an organization can optimize its asset utilization. Nevertheless, asset management is not always easy; it requires hard work, time, energy, and tough decisions in order to produce results (Vanier, 2001). When implementing an asset management plan, there are a handful of key concepts that are very helpful and will lead to

success. The first is to manage real property from a portfolio perspective. Asset portfolios are initially developed by establishing complete accountability of all owned assets (Addo, 2000).

2.7 Comprehensive Planning in Management of Project Execution

According (Gyamfi et al, 2002), road maintenance is politically unattractive; new road construction, road rehabilitation, social or education programs are more "visible" and produce more political prestige. In addition, lack of maintenance culture and little understanding of the economic consequences of poor maintenance even by those in charge of roads make it even more difficult to raise sufficient maintenance funds therefore a comprehensive planning is critical to the success of a maintenance program. To be most effective, planning should focus on all levels of the organization and the relationships between them; assessing up, down, and across levels allows managers to optimize each individual level within the system (Kumar, 2004). Planning should also evaluate across all time horizons and address both the short-term and long-term needs of the organization. Furthermore, planning should focus on the desired results of maintenance – minimizing failures and equipment downtime – and the work required to attain those results (Heggie et al 2002).

Before planning, it is imperative to collect a complete inventory of all maintainable assets and assess their conditions; subsequently, the planning process must also include a method for evaluating and ranking maintenance requirements. The evaluation method should analyze maintenance requirements from the system perspective, to include such aspects as system function, failure modes, failure consequences, and potential measures to prevent future failures (Heggie, 2004). When the evaluation system is applied to the completed inventory, managers can

more easily identify maintenance priorities. Plans should consider all maintenance strategies and potential maintenance actions, to include deliberate component replacement and exploratory maintenance. Planning should be conducted throughout the lifecycle of the maintenance program, starting with initial development of the maintenance strategy. In order to ensure each aspect of a maintenance program is aligned, planning should be conducted simultaneously with scheduling and strategy revisions (Potter, 2007). Additionally, plans should be continuously reviewed and evaluated to reveal necessary modifications, identify gaps, and ensure maximum effectiveness. Managers can also proactively plan for the development and performance of future systems by providing feedback to equipment designers and builders.

2.8 Organizational Support in Maintenance Project Execution

To ensure the success of any maintenance program, it must be supported by all levels of an organization; in some cases, "the best methodology in the world will fail if management staff and workers do not support it" (Pinelo et al., 2003). Furthermore, organizational leadership in control of budget decisions must understand and support the maintenance program; otherwise, adequate maintenance resources may not be secured. Since management support is so critical to the success of a maintenance program, some organizations dictate specific requirements and assign individual responsibility for different aspects of their programs; this measure of accountability helps ensure success (Zietlow, 2008).

As the individuals who implement the maintenance strategy, technicians and craftsman are critical to the success of a program. Even when personnel are fully qualified to perform proper maintenance practices, they may choose to not follow best practices. This lack of support can

result in numerous failures and severely drive down the success of a maintenance program (Smith, 2000). To ensure maintenance personnel support a program, they should be included in the strategy development and planning processes. In fact, their input can be a very valuable contribution to the maintenance program due to the fact that operational experience is a key driver for optimizing maintenance practices (Zietlow, 2008).

In addition to the workers and managers, the customers and facility users who benefit from a maintenance program can contribute to its success. For example, simple equipment inspections can often be performed by the facility user, such that repair needs are only requested when needed (Ashong, 2004). These actions encourage users to become actively involved in the maintenance program and help provide relief for the maintenance staff. A strategy known as Total Productive Maintenance (TPM) is built on user involvement; it expands beyond simple inspections by training users to also perform routine maintenance tasks (Boarnet, 2005). However, TPM is most effective in manufacturing applications where the users are in continuous contact with the maintained equipment, and it may not be applicable in all maintenance contexts.

One way to enhance organizational support for a maintenance strategy in project execution is to promote a reliability based culture in which the organization seeks to constantly improve maintenance methods by evaluating every task and failure (Stock, 2006). A reliability culture encourages a shift from a reactive to a proactive approach to maintenance. Rather than fixing problems, reliability seeks to improve a system to prevent problems; instead of responding to emergencies, reliability attempts to predict, plan, and schedule work (Ankrah, 2000). The reliability culture also takes a more optimistic approach to maintenance goals – rather than

minimizing equipment failures, the reliability approach aims to maximize equipment operational capacity (Addo, 2000).

To achieve the shift from a reactive to a reliability based culture, an organization must have a long-term strategic focus and committed leadership; they must also encourage integration and foster teamwork by aligning reward systems with organizational strategic goals (Dunn, 2007).

2.9 Overview of Road Maintenance

According to Addo (2000), road maintenance is essential in order to: preserve the road in its originally constructed condition, protect adjacent resources and user safety, and provide efficient, convenient travel along the route. Unfortunately, maintenance is often neglected or improperly performed resulting in rapid deterioration of the road and eventual failure from both climatic and vehicle use impacts (Ankrah, 2000). It follows that it is impossible to build and use a road that requires no maintenance. Probably the most valuable tool for any maintenance program is the knowledge and experience gained by individuals performing the maintenance. Every effort should be made to retain competent, knowledgeable, and experienced individuals in these positions not only from the standpoint of instituting and executing a good maintenance program, but for future road planning needs as well (Gwilliam & Kumar 2003).

At the time of independence in 1957, Ghana road network was in very good condition. In the 1960's the road budget declined and maintenance suffered. By the 70's, roads were breaking faster than they could be maintained. The road network was in very poor condition. During this period the roads were under Ministry of Works and Housing. In 1982 Ministry of Roads and Highways was created to (i) formulate road sector strategy and policy,

(ii) co-ordinate and monitor performance of GHA, DFR and DUR, and (iii) improve the condition of roads. However, the creation of new organization did not solve the resource problem. In 1996, Ministry of Roads and Transport (MRT) was created. The Government objective is to clear the large backlog of maintenance on the road network while concurrently maintaining roads that have been rehabilitated and to put financing of maintenance on a sustainable basis (Addo, 2000).

Road deterioration due to lack of maintenance has become a growing issue in a number of developing countries. The problem has been discussed at length and the results of a lack of maintenance have been well defined and quantified. Nevertheless, the extent of the problem is not fully appreciated and the solutions are still not commonly understood (Frost, 2001). Equally, the measures required to rectify the shortcomings are under-estimated. These include the scale of support and capacity development required, and the time-scale necessary for establishing an effective road management system. Such a system should halt road network deterioration and ensure that financial, material and human investments are made in a manner which maintains the quality and value of the assets and, in addition, improves the network in relation to the demands and priorities of the users (Gyamfi et al, 2002).

A World Bank (2005) policy study, on the causes and remedies of road deterioration in developing countries, recommended that the Bank alter its lending policy for road infrastructure projects. The intent of this amendment was to ensure maintenance received top priority in countries where there are moderate to severe financial and institutional constraints on

maintenance. For countries well developed in this area, funding would be conditional on a properly balanced programme of construction, rehabilitation, and maintenance (Frost, 2001).

The use of private sector resources for accomplishing road maintenance is known as contract maintenance or maintenance by contract. Ghana Highways Authority (GHA) has adopted a policy of contracting out road maintenance to independent road contractors as part of its overall pursuit of efficiency and lowering of maintenance costs (Fay & Yepes, 2003). In the short to the medium term, this policy recommends that not more than 10% of maintenance works be executed by force account. This means that the Mobile Maintenance Units and to a very limited extent the forces of the Districts combined do not execute more than 10% of maintenance works. In the long term, however, all maintenance works will be procured by contracting. The general flow of the procedures used in GHA for road maintenance can be broken down into the planning and budgeting stage, followed by the works procurement stage and finally the works execution stage with a feedback through monitoring and evaluation (Larcher, 2008). The procurement process begins after the finalization of the annual maintenance work programme. Procurement of maintenance works involves the whole process of publicizing the maintenance works, selecting a suitable contractor to execute the works and providing the appropriate legal framework and technical specifications to ensure that the maintenance work can be done to the specified quality, at cost effective prices and at the appropriate time (GHA, 2001).

2.10 Financial Reform of Road Maintenance Project Execution

According to Brushett (2004), the best way to secure an adequate and stable flow of funds is to charge road users a road maintenance tariff in exchange for the services of maintaining roads and not to rely on taxes. In most countries the financing of road maintenance through taxes has never

worked satisfactorily and it would be at best dangerously misleading to assume that this will change for the better in the future (Brushett & Kumar, 2001). Road maintenance can be treated as a public service similar to water supply, telephone and electricity services, where the user pays for the services received. To be able to do so, the following conditions must be met: the road user pays in relation to road usage, the one who pays should receive adequate road maintenance services, and somebody not using the road system should not pay. In addition to these criteria the charging system should be easy and inexpensive to administer and difficult to evade. The system that best suits these criteria is an electronic tolling system covering the whole road network. Each vehicle can thus be charged individually according to its usage of any particular road (Larcher, 2008). Unfortunately, this system is not readily available yet and will not be implemented on a comprehensive scale in most of the developing countries in the near future. For the time being, a shadow toll system is recommended, which mainly uses the consumption of motor fuels on roads as a "service meter" and reflects usage of roads fairly well.

This implies a service charge or road maintenance tariff to be levied and collected together with the sale of motor fuels. The only disadvantage of charging this tariff together with the sale of motor fuels is psychological, as most people consider anything charged together with motor fuels as "another tax" to finance general government expenses and not necessarily the provision of road maintenance services. Therefore, it is extremely important to identify and clearly mark this charge as road maintenance tariff and to collect the receipts into a separate fund, independent of any government, departmental or municipal funds and make sure that the proceeds are used for road maintenance only.

In Ghana, the rapid conversion of commercial vehicles from the use of petrol to liquefied petroleum gas (LPG) is making the situation more critical for the mobilization of funds through fuel levy into the road fund. There should be some means to widen the fuel levy to include LPG which will at the same time not affect domestic users as the high cost of LPG for domestic purposes relates to the use of alternate fuel like charcoal with its attendant depletion of the forest.

2.11 Institutional Reform of Road Maintenance

In order to assure an effective and efficient management of road maintenance it is recommended to create an institution to safeguard the public interest in keeping roads in good condition, and to transfer the responsibility of road maintenance from the public to the private sector (Frost, 2001).

How can we safeguard public interest in preserving roads in good condition? Presently, in most of the developing world, public road administrations and the respective ministries are responsible for keeping the road networks in good condition. But hardly anybody in those institutions cares whether this is done well or not. None of them has to face any real consequences of not preserving roads in good condition. Often they don't even know the conditions of the roads under their jurisdiction, even less so they know the asset value of these roads (which is often the biggest or one of the biggest assets governments are responsible for) or whether the asset value is increasing or decreasing (Larcher, 2008). Any commercial enterprise neglecting its assets as governments do would be out of business soon. The ones who actually have to bear the consequences of poor road maintenance are the road users. Therefore, they are the ones who have a direct interest in maintaining roads in good condition and therefore should have a more direct control of overseeing road maintenance spending.

Heggie (2004) reported that one way of achieving such control is to create a Road Maintenance Board, a public institution with complete financial, administrative and technical autonomy and with active road user participation. Depending on the size of a country, there might be either subsidiary or independent local Road Maintenance Boards for the different categories of roads and or road administration districts. The principal attributions of such road boards should be:

- to propose the levels of road maintenance tariffs,
- to administer and manage the Road Maintenance Fund,
- to contract the planning, execution and supervision of road maintenance,
- to safeguard the investments made in roads, and
- to inform the public periodically on the effectiveness and efficiency of road maintenance spending.

2.12 How to incorporate Maintenance into Project and Sector Strategies

According to (Brushett S, 2004), to be sure that road maintenance is not neglected, it needs to be incorporated into project and sector strategies. That requires a clear and realistic strategy for road network management that attends to the following key principles:

- ***Use the core network concept.*** As a rule of thumb, 80 percent of traffic flows over 20 percent of the road network. This core network is often the responsibility of the national government's highways ministry. These most heavily trafficked roads should receive priority for full routine and periodic maintenance.
- ***Clearly assign to specific institutions "ownership" of roads and responsibilities*** for development, maintenance, and priority-setting. Often, when construction or upgrading

has been completed by the national road agency through a loan or grant, responsibility for maintenance remains unclear or is handed over to the "community." Good practice indicates that the agency that implements the road construction or rehabilitation be responsible for subsequent routine and periodic maintenance (Frost, 2001). For example in India the national highways (about 65,000 km) are the responsibility of the Ministry of Roads and Highways, while state highways (about 124,300 km) are the responsibility of the states. At each level the same agency is responsible for development as well as maintenances of its "own" network.

- ***Involve all agencies and institutions*** associated with roads at national, regional, district, and local community levels as well as ***road users and other stakeholders*** in identifying road issues and planning road interventions. Other stakeholders include organizations dealing with tourism, health care, rural development, agriculture, and mining; road user associations; community organizations; nongovernmental organizations; and businesses.
- ***Determine the overall level of funding required*** and the balance among construction, rehabilitation, and maintenance. Priority for maintenance funds should go to roads that are functionally important and in reasonably good condition. Routine maintenance should be included as a cost component in donor-funded road construction projects even if maintenance is fully funded by government resources, to ensure that it is not neglected.
- ***Develop standards for improving roads***. Design standards and maintenance practices should be reviewed to ensure the sustainability of the entire road network. For instance, for low-volume roads design standards may stress accessibility and durability rather than width and speed.

- ***Include maintenance of bridges, road signs, sidewalks, and other road structures***. Neglected road structures and signs lead to increased road accidents and, in the case of bridge deterioration, can lead to road closures and network disruptions.
- ***Assess capacity to fund, manage, and supervise*** road maintenance. International donors have become increasingly involved in road maintenance programs, and this can be a good if temporary solution for some road agencies. For the longer term, donors should help to create a more stable source of funds.
- ***Assess the capacities of municipal, district, and provincial road agencies*** to perform any management and supervision responsibilities delegated by the central road department.
- ***Define objectives and develop plans*** for road maintenance capacity building, including training, technical assistance, and local revenue generation.

2.13 What is Maintenance?

The goal of maintenance is to preserve the asset, not to upgrade it. Unlike major road works, maintenance must be done regularly. Road maintenance comprises "activities to keep pavement, shoulders, slopes, drainage facilities and all other structures and property within theroad margins as near as possible to their as-constructed or renewed condition" (Kumar, 2004). It includes minor repairs and improvements to eliminate the cause of defects and to avoid excessive repetition of maintenance efforts. For management and operational convenience, road maintenance is categorized as routine, periodic, and urgent.

- ***Routine maintenance***, which comprises small-scale works conducted regularly, aims "to ensure the daily passability and safety of existing roads in the short-run and to prevent

premature deterioration of the roads" (Heggie, 2004). Frequency of activities varies but is generally once or more a week or month. Typical activities include roadside verge clearing and grass cutting, cleaning of silted ditches and culverts, patching, and pothole repair. For gravel roads it may include regarding every six months.

- ***Periodic maintenance***, which covers activities on a section of road at regular and relatively long intervals, aims "to preserve the structural integrity of the road" (WB Maintenance website). These operations tend to be large scale, requiring specialized equipment and skilled personnel. They cost more than routine maintenance works and require specific identification and planning for implementation and often even design. Activities can be classified as preventive, resurfacing, overlay, and pavement reconstruction. Resealing and overlay works are generally undertaken in response to measured deterioration in road conditions. For a paved road repaving is needed about every eight years; for a gravel road re-graveling is needed about every three years.
- ***Urgent maintenance*** is undertaken for repairs that cannot be foreseen but require immediate attention, such as collapsed culverts or landslides that block a road.
- Maintenance does not include rehabilitation, building shoulders, or widening roads. If the sections to be rebuilt constitute more than 25 percent of the road's length, the work is rehabilitation, not maintenance.

2.14 Why is Maintenance Important?

Roads are among the most important public assets in many countries. Road improvements bring immediate and sometimes dramatic benefits to road users through improved access to hospitals, schools, and markets; improved comfort, speed, and safety; and lower vehicle operating costs.

For these benefits to be sustained, road improvements must be followed by a well-planned program of maintenance. Without regular maintenance, roads can rapidly fall into disrepair, preventing realization of the longer term impacts of road improvements on development, such as increased agricultural production and growth in school enrolment (Heggie, 2004).

Postponing road maintenance results in high direct and indirect costs. If road defects are repaired promptly, the cost is usually modest. If defects are neglected, an entire road section may fail completely, requiring full reconstruction at three times or more the cost, on average, of maintenance costs. The Ghana Highways Authority (GHA) estimates that repair costs rise to six times maintenance costs after three years of neglect and to 18 times after five years of neglect. To avoid such escalating costs, GHA first "allocate[s] its available funding resources to ideal maintenance actions (e.g., reseals and overlays), and thereafter to more extensive maintenance actions (e.g., rehabilitation), and finally to new construction" (GHA 2004).

Delayed maintenance has indirect costs as well. Neglected roads steadily become more difficult to use, resulting in increased vehicle operating costs (more frequent repairs, more fuel use) and a reluctance by transport operators to use the roads. This imposes a heavy burden on the economy: as passenger and freight services are curtailed, there is a consequent loss of economic and social development opportunities.

Countries need a core road network that carries about 80 percent of national traffic, including key roads in urban areas and roads providing sufficient access to rural areas. Some part of the

overall road budget thus has to be spent on construction and some part on maintaining the core network. But many countries have tended to favour new construction, rehabilitation, or reconstruction of roads over maintenance. This has led to a steady increase in the backlog of road repairs and a loss of development impact. In Sub-Saharan Africa for every kilometer of road rehabilitated, an estimated three kilometers of road fall into disrepair, leading to a net deterioration in the total road network (World Bank 2003). The situation is similar in many other developing country regions. Much of the capital cost of road construction is financed by donor funds, with low perceived cost to the country but high real costs, while maintenance is funded locally, requiring difficult and unpopular tax mobilization.

2.15 Summary

The critical review of the definition of management, management functions and evolution of management theories, also the public and private management, maintenance and assets management, comprehensive planning organizational support and overview of road maintenance equips the researcher with immense knowledge on the issues bothering road maintenance, as overseen by GHA, the Volta Region of Ghana.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter looks at the methodology employed by the researcher for the study which included the administration of questionnaires to target respondents namely; employees of Ghana Highways Authority in the Volta Region. The study was specifically undertaken by way of inquiries and interviews. The questionnaire was self-administered and the secondary data for the research was the data gained on unpublished research dissertations, print media and internet search engine including websites on the topic of interest of the study which is the assessment of the administrative process in the management of maintenance project execution on trunk roads. By methodology, Buami (2006) refers to it as the modes that clarify, explain and assist in the understanding of the research approach, research design methods of analysis.

3.2 The study Area

The study was centred on the Road sector. The Ghana Highway Authority was chosen as a representation of the Road Agencies, being the biggest and oldest in them of structure and age. The Volta Regional office of the Ghana highway Authority was chosen just for convenience sake as it was closer to the researcher, but it was also believed to give a good reflection of what pertains in the Ghana Highway Authority and the various Road Agencies.

3.3 Population and Sampling Technique

The population of study is made up of all members of staff of Ghana Highway Authority (GHA) in Volta Region. The sample size of the study is thirty (30) employees within the various divisions of Ghana Highways Authority, Volta Region in connection with maintenance project

execution. The size of the sample was based on considerations that, not all the staff members even understand the processes involved in the execution of maintenance projects. Moreover, due to time constraints, it seemed most suitable to have a sample size that could be managed by the researcher considering the time allotted to the researcher and that could at the same time be a good representation for the purposes of the study.

Sampling for this research was drawn from the Volta Regional office of the Ghana Highways Authority. A judgemental sampling technique was used to select staff members who play various roles in managing project execution on roads network. Thirty (30) employees were selected to form the sampling frame. The reason for using a judgemental sampling technique is that not all the staff members of the company are involved in managing project execution on roads network and thus may not provide responses that may meet the objectives of the study.

3.4 Data Collection Procedure

The researcher personally conducted the interview with the selected staff members at the Volta Regional office of the Ghana Highways Authority and administered the questionnaire which contained series of structured questions which were related to the research work and directed to respondents with the aim of gaining first-hand information. Respondents were allowed sufficient time of five working days to complete the questionnaire. The questionnaire consisted of both open ended and close-ended questions. Thus, in some cases, respondents were to choose the option that best reflected their opinions. The questionnaire afforded respondents much flexibility and privacy in answering the questions without any undue influence. The questionnaire was in simple and unambiguous language and as such, did not pose any problem as regards interpretation.

3.5 Research Instruments

Interview guide in the form of questionnaire was designed in two sections with the first demanding the background information on respondent occupation. The second part was on management of maintenance project execution in the form of checklist. These questionnaires were designed and administered to respondents involved in the management of maintenance project execution on trunk roads. The main aim of collecting the primary data was to provide an effective analysis of the theoretical application of assessing administrative process in the management of maintenance project execution on trunk roads.

3.6 Research Design

A field targeted investigation for assessing the administrative process in the management of maintenance project execution on trunk roads. Field data on user perceptions were sampled using randomly administered questionnaires among Ghana Highways Authority employees in the Volta Region. The questionnaires were administered in the region with a total of thirty (30) copies filled, returned and analyzed in this study. The approach provides the researcher the opportunity to advance the study from a theoretical point of view and to effectively relate the findings to the theoretical model and available literature.

A case-study strategy was adopted by the researcher towards achieving the objectives of the study. The case selected for the study is employees of Ghana Highways Authority in Volta Region. Yin (2003) highlighted the importance of context, adding that, within a case study, the boundaries between the phenomenon being studied and the context within which it is being studied are very important. The case study strategy will be of immense interest if one wishes to

gain a rich understanding of the context of the research and the processes being enacted (Morris and Wood, 1991).

3.6.1 Profile of Ghana Highways Authority

The Ghana Highway Authority was established as a body corporate by GHA Degree 1974 (NRCD 298). NRCD 298 was repealed by GHA Act 1997 (Act 540) which, however, continued to task the Authority with the responsibility for the administration, control, development and maintenance of the country's trunk road network totalling 13,367 km and related facilities. GHA's 13,367 km trunk roads make about 33% of Ghana's total road network of 40,186 km.

3.6.2 GHA Directorate

The Authority has a Managing Director, designated as Chief Executive. There are three (3) Deputy Chief Executives: the Deputy Chief Executive (Administration); the Deputy Chief Executive (Development); and the Deputy Chief Executive (Maintenance).

3.6.3 Departments, Divisions and Regions/Road Area Offices

There are sixteen Divisions, in the Head Office, each of which is headed by a Director, and ten Regional Offices headed by Regional Highway Directors. The GHA also has twenty-eight (28) Area offices nation-wide. The Internal Audit and Legal Divisions, though directly responsible to the Chief Executive, are under the Administration Department for administrative purposes

Vision

The Vision of the Ghana Highway Authority is to ensure that: Ghana has a smooth economic, efficient, safe and reliable trunk road network that will minimise road accidents and saves lives as well as link national, regional, district capitals and other major towns, cities and neighbouring countries, and that the road network also serves as the main routes for internal distribution, defence, export and import, in harmony with other modes of transportation.

3.6.4 Mission Statement

To provide a safe and reliable trunk road network at optional cost by taking advantage of modern technology in road -building and new income-generating methods to facilitate socio-economic development in the country.

3.6.5 Road Maintenance Division

MISSION: To preserve the trunk road network, ensuring safety and reliability for road users in an efficient manner and in harmony with the environment.

MODE OF OPERATION:

GHA is structured such that Ten Regional Offices, headed by Regional Directors, are all road maintenance focused. And, Regional activities are coordinated at Head office by the Director of Road Maintenance.

For purposes of effective monitoring of field maintenance, the country is divided in two sectors, the Northern and Southern sectors.

Northern Sector:

Upper East Region

Upper West Region

Northern Region

Brong Ahafo Region

Ashanti Region

Southern Sector:

Eastern Region

Central Region

Western Region

Greater Accra Region

Volta Region.

About 95% of maintenance works are accomplished by contract whilst the remaining 5% is taken by two Mobile Maintenance Units and the Bridge Maintenance unit on Emergency basis.

This Division is responsible presently, for over 13,367 km trunk roads in the country. Its function is:

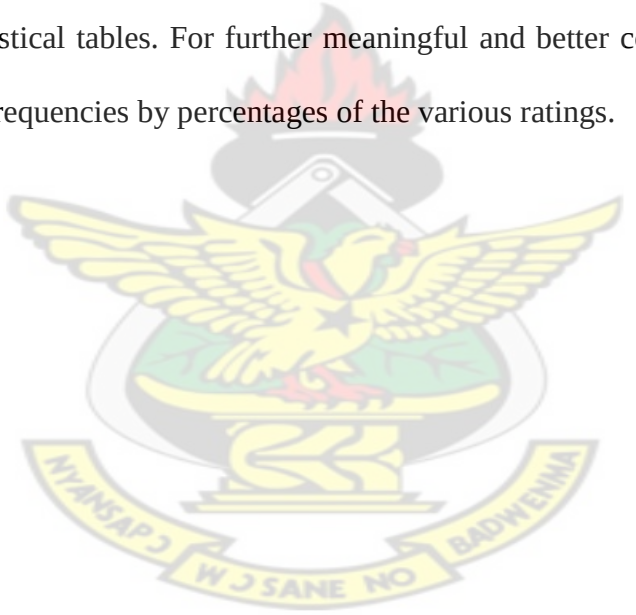
- To preserve the entire highway, including surface, shoulders, roadsides and such traffic-control devices as are necessary for the safe and efficient utilization of the highways.
- The Road Maintenance Division operates through 10 regional highway Directors who report to the deputy chief executive (maintenance).
- At the Head Office the director of Road Maintenance collates reports from the regions. He also coordinates maintenance activities in the various regions with the assistance from 2 maintenance managers in-charge of Northern & Southern sectors.

- The Division also administers 2 mobile road maintenance units and a bridge maintenance unit that operates on force account.
- The Division is responsible for the maintenance of road & bridge infrastructure throughout the country

Source: (*www. highways.gov.gh.com*)

3.7 Data Analysis

Ms Excel and SPSS were used for data capture and organization. Data was captured with SPSS and organized into statistical tables. For further meaningful and better comparison, charts were drawn on the tables of frequencies by percentages of the various ratings.



CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1 Introduction

The study employed simple descriptive statistics such as frequency distribution and percentages to compare some of the measured parameters such as demographic data, responses to issues etc. The analysis was performed around the objectives for this study; however, other relevant details were added for better presentation of findings. Tables and graphs were used with their appropriate figures and wordings for clarity in presentation.

4.2 Analysis of Findings

The data was analyzed giving thought to the main research question: to assess the administrative process in the management of maintenance project execution on trunk roads. Each assessment was looked at individually and descriptive statistics were computed for each.

4.2.1 Findings from Ghana Highways Authority (GHA) Employees

A total number of thirty (30) employees of the Ghana Highways Authority in the Volta region responsible for managing maintenance of project execution on roads were selected to provide answers to the structured questionnaire.

Table 4.2.1a: Sex of Respondents

Sex	Frequency	Percentage (%)
Male	25	83.33
Female	5	16.67
Total	30	100

Source: Field Research, June 2012

Figure 4.2.1a: Sex of Respondents

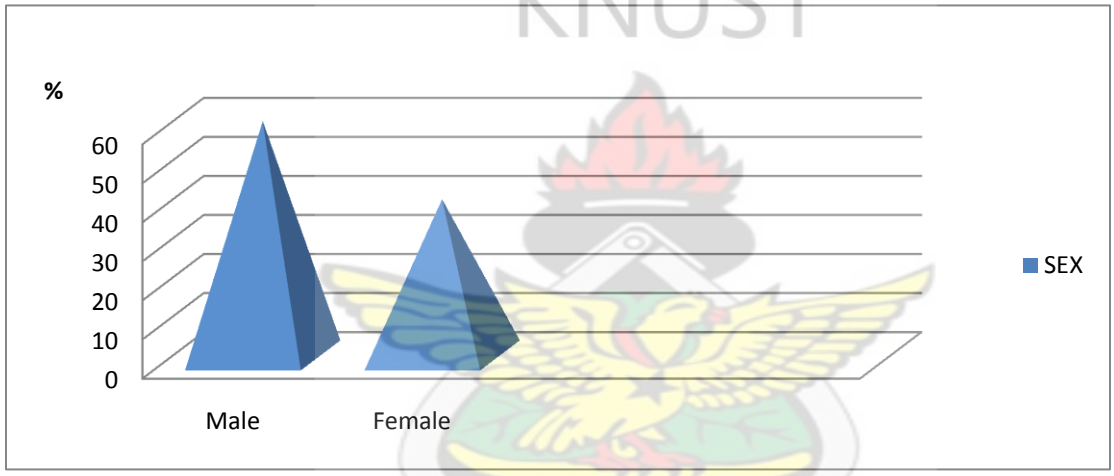


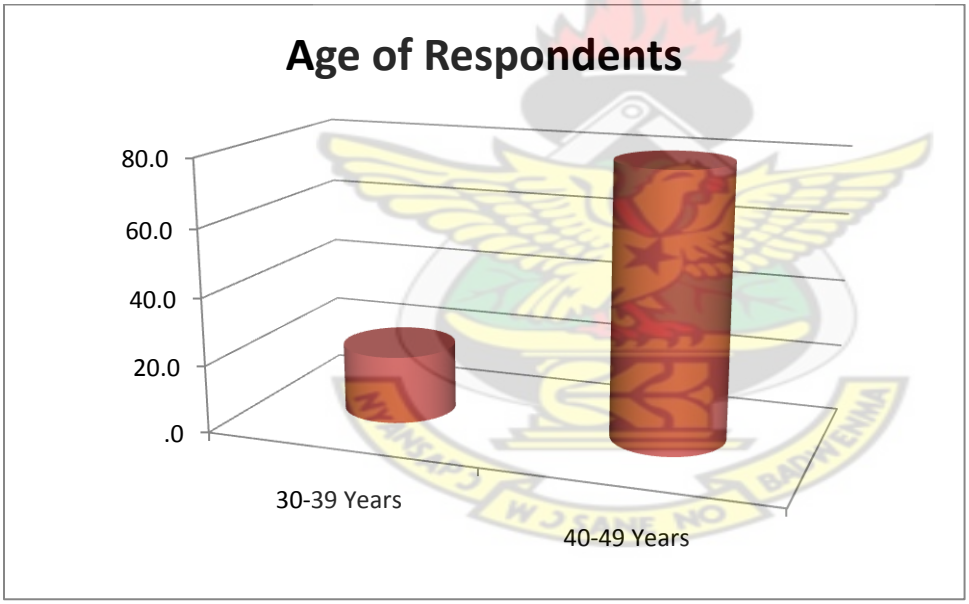
Table 4.2.1a and figure 4.2.1a shows sex of employees of Ghana Highways Authority in Volta region. 83.33% of the sampled respondents were males and 16.67% of them were females. The findings indicate that males form majority of employees at Ghana Highways Authority in the Volta region. This implies that the GHA engages more male for Road maintenance related activities than female.

Table 4.2.1b: Age of Respondents

Age Range	Frequency	Percentage (%)
25-29 Years	0	0.0
30-39 Years	4	13.33
40-49 Years	26	86.67
50-59 Years	0	0.0
60-above	0	0.0
Total	30	100.0

Source: Field Research, June 2012

Figure 4.2.1b: Age of Respondents



The age distribution ranged between 25 and 60 years. Employees were categorized into five groups as (25-29 Years), (30-39 years), (40-49 years), (50-59 years) and (60 and above). This classification is similar to the earlier reports by Yusuf et al (2006). Majority of the employees were between 40-49 years representing 86.67%. The second group representing 13.33% was between the ages of 30-39 years. This also implies that the GHA Regional office are packed with

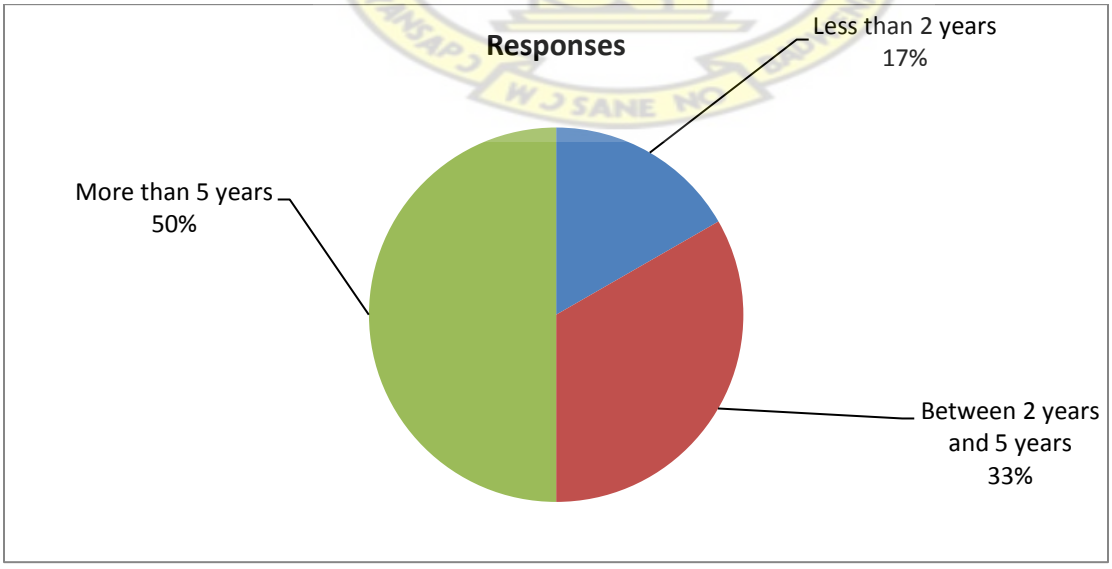
middle aged personnel. It was explained that, young employees undergo several months of training mainly at the Head office where they are attached to experience officials for a long time before theat, young employees undergo several months of training mainly at the Head office where they are attached to experience officials for a long time before theat, young employees undergo several months of training mainly at the Head office where they are attached to experience officials for a long time before they are brought to the Regions.

Table 4.2.1c: How long have you been with Ghana Highways Authority?

Responses	Frequency	Percentage (%)
Less than 2 years	5	16.7
Between 2 years and 5 years	10	33.3
More than 5 years	15	50.0
Total	30	100.0

Source: Field Research, June 2012

Figure 4.2.1c: How long have you worked for Ghana Highways Authority?



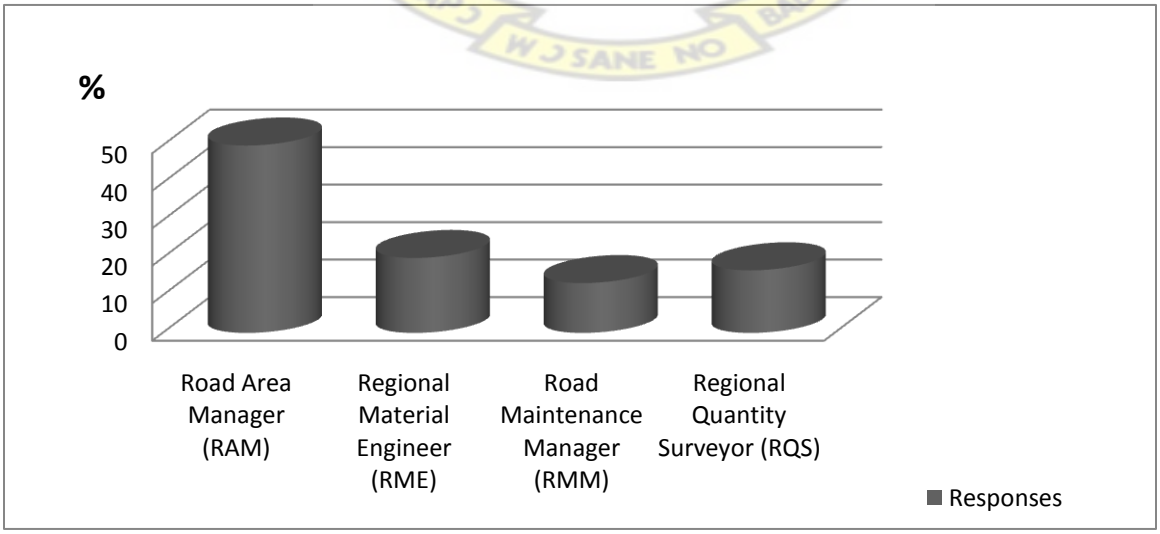
Years of work experience at Ghana Highways authority differed between responses. Concentration of employees was relatively higher (50%) in the category of more than 5 years. 10 responses representing 33.3% indicated between 2 years and 5 years work experience. Few employees (5 responses) representing 16.7% had working experiences of less than 2 years as shown on table 4.2.1c and figure 4.2.1c. This implies that the respondents generally know much about GHA and must be experience in their respective areas. This is likely to result in more realistic answers to the questionnaire.

Table 4.2.1d: What role do you play at Ghana Highways Authority?

Responses	Frequency	Percentage (%)
Road Area Manager (RAM)	15	50.0
Regional Material Engineer (RME)	6	20.0
Road Maintenance Manager (RMM)	4	13.3
Regional Quantity Surveyor (RQS)	5	16.7
Total	30	100.0

Source: Field Research, June 2012

Figure 4.2.1d: What role do you play at Ghana Highways Authority?



The respondents were also asked to indicate the roles they play at Ghana Highways Authority (GHA). 50% of the respondents mentioned that they were Road Area Managers (RAM); 20% said they were Regional Material Engineers (RME); 16.7% also indicated they were Regional Quantity Surveyor (RQS) while the remaining 13.3% said Road Maintenance Manager (RMM). The findings confirm Dung's (2003) analysis that the role of Road Area Managers are very critical since they are responsible for the operational and control of the maintenance in their road areas.

Table 4.2.1e: How do you organize periodic road maintenance?

Responses	Frequency	Percentage (%)
ensuring that well-defined system of rules, standard operating procedures and norms are in line with quality road networks every week	30	100.0
monitoring and checking efficiency of road networks	0	0.0
going by specific requirements of the Ghana Highways Authority	0	0.0
Total	**30**	**100.0**

Source: Field Research, June 2012

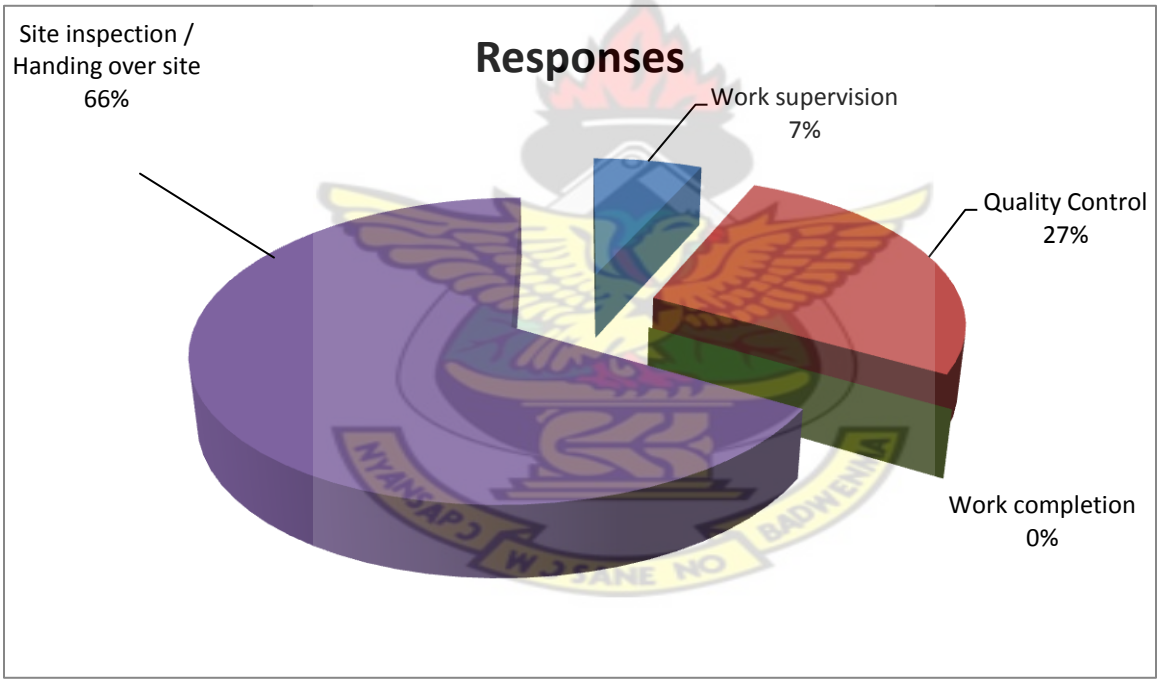
The study also asked respondents how they organise periodic road maintenance. Total respondents representing 100% indicated that they organise periodic road maintenance by ensuring that well-defined system of rules, standard operating procedures and norms are in line with quality road networks every week. The results imply that periodic road maintenance is important to ensuring that all standards are met in quality road networks construction.

Table 4.2.1f: Which processes are used to execute periodic road maintenance?

Responses	Frequency	Percentage (%)
Work supervision	2	7.0
Quality Control	8	27.0
Work completion	0	0.0
Site inspection / Handing over site	20	66.0.
Total	**30**	**100.0**

Source: Field Research, June 2012

Figure 4.2.1f: Which processes are used to execute periodic road maintenance?



Regarding the question of which processes are used to execute periodic road maintenance, majority of respondent representing 66% said Site inspection / Handing over site, 27% said Quality control whilst 7% said Work supervision. There was no response for Work completion.

Table 4.2.1g: Which practice(s) do you see as management of periodic maintenance of road?

Responses	Frequency	Percentage (%)
The department adheres to job specialization and the division of labour in the execution of road maintenance	7	23.3
Supervisors have the right to give orders and the power to exhort subordinates for obedience	3	10.0
The organization has a single plan of action to guide managers and workers	20	66.7
Total	**30**	**100.0**

Source: Field Research, June 2012

Results from Table 4.2.1g requesting the practises which employees see as management of periodic maintenance of road indicate that 66.7% of the employees at Ghana Highways Authority (GHA) in Volta region mentioned that organization has a single plan of action to guide managers and workers. 23.3 % of respondents also indicated that the department adheres to job specialization and the division of labour in the execution of road maintenance whilst 10% said supervisors have the right to give orders and the power to exhort subordinates for obedience.

Table 4.2.1h: Do you agree that arrangement of departmental positions maximizes efficiency and provides employees with satisfying career opportunities at Ghana Highways Authority?

Responses	Frequency	Percentage (%)
Agree	25	83.3
Disagree	5	16.7
Total	**30**	**100.0**

Source: Field Research, May 2012

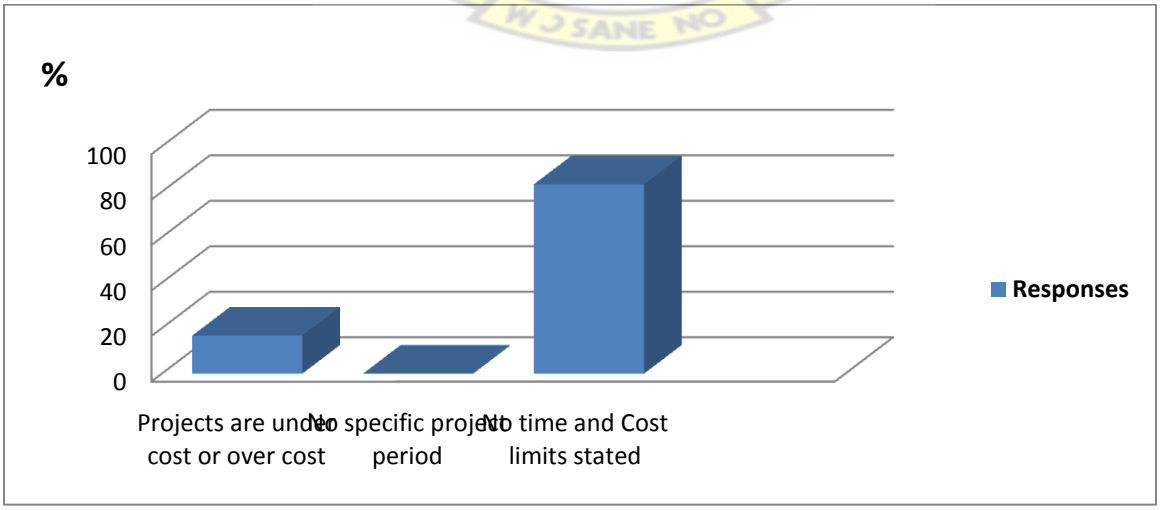
Table 4.2.1h revealed that 83.3% of employees interviewed said they agreed to the question of whether arrangement of departmental positions maximizes efficiency and provides employees with satisfying career opportunities at Ghana Highways Authority. However only 5% disagreed to this. This implies that the organizational culture of the GHA motivate workers to strive to improve their professional competence through continuous training in order to improve efficiency and majority of the workers understand and practice it.

Table 4.2.1i: Which issues & challenges affects the administrative process in the management of maintenance project execution on roads?

Responses	Frequency	Percentage (%)
Projects are under cost or over cost	5	16.7
No specific project period	0	0.0
No time and Cost limits stated	25	83.3
Total	**30**	**100.0**

Source: Field Research, May 2012

Figure 4.2.1i: Which issues & challenges affects the administrative process in the management of maintenance project execution on roads?



Data analysis on which issues & challenges affects the administrative process in the management of maintenance project execution on roads indicated that a maximum of 83.3% mentioned that No time and Cost limits stated as the main challenge whilst the remaining 16.7% indicated the challenge that projects are under cost or over cost. This is shown on table 4.2.1i and figure 4.2.1i above. The implication of this is that, many people are having the perception that projects time and costs are not adhered to. It was explained that close to 100% of the projects in the Region have suffered from both cost and time overrun.

Table 4.2.1j: Which challenges confront Ghana Highways Authority (GHA) in the maintenance of road projects?

Responses	Frequency	Percentage (%)
Impact on quality of the road network	18	60.0
weak disbursement system for both routine and periodic maintenance and monitoring arrangements	5	16.7
Optimal resource allocation for activities	7	23.3
Total	**30**	**100.0**

Source: Field Research, June 2012

Figure 4.2.1j: Which challenges confront Ghana Highways Authority (GHA) in the maintenance of road projects?

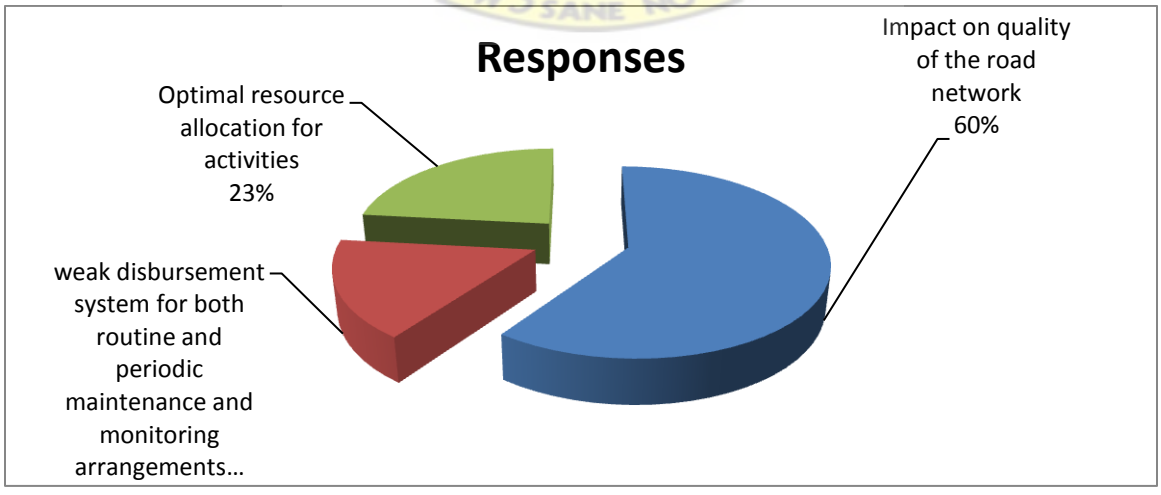


Table 4.2.1j and figure 4.2.1j above indicates that a maximum of 60% of sampled respondents said the impact on quality of the road network was the main challenge confronting Ghana Highways Authority (GHA) in the management of maintenance project execution on roads. 23.3% said optimal resource allocation for activities whilst 16.7% said weak disbursement system for both routine and periodic maintenance and monitoring arrangements.

Table 4.2.1k: In your view, which is the key role of GHA Maintenance Department?

Period	Frequency	Percentage (%)
ensuring adequacy of revenues for maintenance needs	4	13.3
maintenance of all National, Inter Regional and Regional roads in the network	19	63.4
ensuring expeditious collection of revenues from source	7	23.3
efficient delivery of road infrastructure services	0	0
Total	**30**	**100.0**

Source: Field Research, June 2012

With regards to the question of which is the key role of GHA Maintenance Department, the data as shown on table 4.2.1k reveals that 63.4% of total respondents indicated the role of ensuring maintenance of all National, Inter Regional and Regional roads in the network, 23.3% said ensuring expeditious collection of revenues from source whiles the remaining 13.3% mentioned ensuring adequacy of revenues for maintenance needs. This implies that majority of GHA personnel are conscious of the organization's mission and therefore easier to move them in that direction for maximum efficiency.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of findings

The research study commenced with the business profile of Ghana Highways Authority (GHA), and with regards to answering the key questions identified for the exercise, the findings of this research will have wide support for effective maintenance project execution and to make recommendation on how administrative processes can be managed in maintenance project execution on roads nationwide.

In Ghana roads have been the backbone of passenger and freight transport since independence. Since then, road networks have been growing rapidly. Several years ago the rate of expansion started to slow down and the road networks began to age fast (Addo, 2000). Scarce resources, especially in the 80's, have contributed to an ever-decreasing amount of money allocated to road maintenance. Towards the end of the decade several countries in Africa spent less than 20% of the amounts necessary to maintain their road networks in adequate conditions (Ankrah, 2000).

In the early 90's funding levels for the road sector slightly improved, but funds were and still are mainly used for road rehabilitation and only a little is being spent for the more cost effective routine and periodic maintenance activities (Addo, 2000). Nowadays, to raise funds for road rehabilitation is much easier than for road maintenance, due to the fact that loans to finance rehabilitation are still readily available from international lending agencies, while funding for road maintenance is subject to the political debate in parliament and is normally losing ground to

other politically more attractive issues. Generally between 2% and 3% of the new investment value of the road network is required for routine and periodic maintenance alone according to. Unfortunately, even today, regions in Ghana are spending normally between 20% and 50% of the funding required for adequate road maintenance only. In addition, these already insufficient funds often are being used inefficiently in a poor state. Normally, only 1/3 of the paved main road network is in good, 1/3 in regular and 1/3 in poor condition. Unpaved roads are in even worse shape. Road conditions naturally vary from country to country. These appalling figures were true 10 years ago and still hold true today, despite the huge amounts poured into road rehabilitation during recent years. Past efforts to improve the level of financing for road maintenance have either failed or were not sustained. Equally unsuccessful were most of the countless efforts, mainly financed by multilateral or bilateral agencies, to improve the performance of the public road administrations in the region The Government realized that poor road infrastructure was a major constraint to economic growth and social development and thus have identified the maintenance of the road network as a development priority (Addo, 2000).

Findings of data analysis obtained from the research outlines the following:

- Majority of respondents representing 50% indicated that they were directly involved and responsible for the operational and control of the maintenance works in the Road Areas.
- Total respondents representing 100% indicated that they organise periodic road maintenance by ensuring that well-defined system of rules, standard operating procedures and norms are followed.

- 66% of total respondents agreed that the main process which is used to execute periodic road maintenance was site inspection / handing over site, site / technical meetings, quantity and quality control and time/cost control.
- 66.7% and 23.3% of respondents respectively indicated that the practise of the organization having a single plan of action to guide managers and workers as well as the practise of the department adhering to job specialization and the division of labour in the execution of road maintenance were the practices used in the management of periodic maintenance of road.
- 83.3% of employees interviewed said they agreed to the question of whether arrangement of departmental positions maximizes efficiency and provides employees with satisfying career opportunities at Ghana Highways Authority.
- 83.3% mentioned No time and Cost limits stated as the main issues & challenges affecting the administrative process in the management of maintenance project execution on roads.
- 60% of sampled respondents said the impact of quality on the road network was the main challenge confronting Ghana Highways Authority (GHA) in the management of maintenance project execution on roads.
- 63.4% of total respondents indicated the role of ensuring maintenance of all National, Inter Regional and Regional roads in the network.

The findings imply that the GHA to a large extent, follow some bureaucratic process as a public organisation in the management of maintenance projects. However, most of the personnel directly involved in the management of maintenance projects are of the view that projects are

executed without fixed completion dates and contract sums which is unusual. Probably, the long delays experienced in execution of maintenance projects coupled with extension of time and their attendant cost may justify their perception and GHA much work to change that perception

5.2 CONCLUSIONS

Ghana government have been addressing the low density and management of maintenance project execution on trunk roads and enhancing nationwide road networks. Institutional reform since the mid-1990s has progressed well, with a remarkable consensus on the content. Most countries have second-generation road funds supported by fuel levies, and many others have autonomous road agencies (Frost, 2001). Specialist maintenance management agencies have been established, and new forms of contract-based maintenance are being introduced. Although important funding gaps remain, results are discernible.

On average, 80 percent of the main road network is in good or fair condition, and the current value of the national road networks is at least 70 percent of their potential. The limited time series available also suggests that a number of regions have improved road conditions over time. Despite this progress, the reform agenda is incomplete. In many cases, fuel levies have been set too low to be effective, and road funds and agencies do not always meet all good practice design criteria. Modern contracting and contract management methods are far from universal. Furthermore, while policy makers' attention has focused on the institutions and financial flows for the interurban roads, other challenges such as poor records of management of maintenance project execution on roads have surfaced that will require different types of solutions.

First, the reforms to the interurban road network have affected rural roads much less. Even though agriculture is viewed as an engine of growth, only one-third of rural inhabitants live within 2 kilometers of an all-season road.. The rural environment presents particular institutional challenges for road maintenance. Second, surface transportation is about more than good roads. Africa continues to be handicapped by very high road freight tariffs, driven primarily by high profit margins rather than high costs (or defective roads).

5.3 RECOMMENDATIONS

The rehabilitation of the road network, and the build up of institutional, financial and technical capacity for its continued maintenance, are among the most critical challenges confronting transport planners and policy makers in Africa. In a bid to meet burgeoning developmental needs in the 1960s and 1970s, many African countries expended considerable sums to expand their road networks. At the same time the resource base for maintaining existing and newly created road assets was squeezed and the performance of the network failed to match expectations.

In order for effective management of maintenance project execution on roads, most countries relied on regular recurrent budget funding through the treasury to finance maintenance – the budgeted amounts normally fell well short of requirements and what had been budgeted was rarely fully allocated. Some countries sought to set up Road Funds (RFs) (referred to as the "*first generation" road funds*) usually as a line item in the national budget. This represented a type of "earmarking" of government revenues to finance a service, administered and largely delivered by government departments and allocated according to more or less pre-defined priorities. The RFs

generally fell well short of their goals as manifested in poor governance (diversion and inappropriate usage of funds, lack of auditing), poor collection and disbursement and inadequate contribution for yearly maintenance of the country's road network

Ghana Highways Authority could put in place a policy guideline that:

- Ensures that for future projects of large magnitude, the Ghana Highways Authority (GHA) should ensure that construction works are executed on contract basis.
- Ghana Highways Authority (GHA) should ensure that road contractors rectify the defects observed during the field inspection of the completed project.
- Management members of Volta Regional Office of GHA should be sensitized on the need to have enough information about periodic maintenance projects

The Volta region's trunk road network comprises strategic trading corridors linking deep-sea ports to economic hinterlands. These corridors, which carry about GHS50 billion of trade a year, include no more than 10,000 kilometres of road. The concept of an intraregional trunk network remains a distant reality because of missing links and poor maintenance on key segments. Between 60,000 and 100,000 kilometres of road are required to provide such intracontinental connectivity. Therefore Ghana Highways Authority (GHA) should ensure efficient assessment of the administrative process in the management of maintenance project execution on trunk roads.

This finding clearly shows that timely attention to maintenance reduces the expenditure needed to sustain the road system in the long term (Harral and Faiz 1988).

Good governance is thus critical for safeguarding road quality through good budget finance and a professionally competent public sector implementation agency. Countries with road funds and high fuel levies are substantially more successful at raising finance that translates into higher road maintenance expenditures. Countries with road funds and quasi independent road agencies show substantially higher quality on main road networks.

Based on these findings, it is recommended that there should be road funds and high fuel levies which would translate into higher road maintenance expenditures. Hence, Ghana Highways Authority (GHA) should be properly educated on efficient road funds management and maintenance efforts.

Some of the key lessons emerging from this study are:

(a) Setting up dedicated financing arrangements is a necessary but not a sufficient condition to ensure that a sustainable and stable basis of road maintenance is established which translates to improved service delivery. It is equally necessary to ensure that: (i) commitment exists at all levels to make commercialized road management work; (ii) aggregate resources are sufficient to cover all parts of the road network; (iii) road user fees are based on the maintenance "needs" of the road network; (iv) the road boards are appropriately constructed to ensure equitable representation of user interests; (v) a clear allocation of responsibilities exists between the road funds administration and road agencies; and (viii) the road agencies have the capacity to carry out road maintenance works efficiently and effectively.

(b) Maintenance of main and urban road network is on a (modestly) improving trend even given the aforementioned limitations. That is not true for the rural network whose quality continues to

deteriorate. This is partly a reflection of an inadequate planning and programming framework and partly a lack of capacity in the rural areas. Years of neglect have limited the capacity of the road agencies to carry out maintenance works, a deficiency most apparent in rural and feeder road agencies. Addressing this issue would benefit from dissemination of appropriate technology practice as well as alternate approaches to strengthen local construction industry that is relevant to the rural road environment.

5.4 Directions for Future Research.

From the findings of this research, it is recommended that further research is conducted in the road sector on the effect that delayed payment on certified certificates of work done have on the execution of road projects. The following may be a guide to the researcher.

Delayed payment has been a major reason cited for the request of extension of time with cost. Also, delayed payment attracts interest on the delayed amount and could impact heavily on the overall budget of a project. Social benefits expected to be derived from projects could also be eroded due to cash flow problems which may be due to delayed payment and subsequent delays in the completion of projects.

REFERENCES

Addo, S.T (2000): "*The Role of Transport in the Socio-economic development of developing countries: a Ghanaian Example*" The Journal of Tropical Geography, Singapore, Vol 48 pp. 1-8

Ankrah, F.P (2000): *The Development of Road Transport in Ghana as a Spatio-Tempral Process:* A Case Study of the Eastern Region presented to the Department of Geography and Resource Development, Univ. of Ghana, Unpublished MPhil Thesis.

Ashong (2004). "*The Development of Labour-Based Road Programme involving the Private Sector :* The Ghana Experience" 5th ASIST Regional Seminar for Labour-based Practitioners.

Liautaud B, (2001). *Maintaining Roads. The Experience with Output-Based Contracts in Argentina*. The World Bank, Washington, D.C.

Boarnet, M.G (2005): *Transportation Infrastructure, Economic Productivity. And Geographic Scale: Aggregate Growth versus Spatial Redistribution*. Working Paper No. 225, Univ of California Transportation Center, Berkeley, USA.

Brushett, S. and Kumar A, (2001). "*Improving road management and financing: A review of some recent experience of policy reforms in Africa*", Proceedings of the First Road Transportation Technology Conference in Africa, Arusha, United Republic of Tanzania, pp. 288-304.

Stock E. A. (2006). "*The Problems facing Labor-based Road Programs and What to do about them:* Evidence from Ghana" Sub-Saharan Africa Policy Program SSATP Working Paper No. 24.

Frost, M., (2001). "*Imperatives in Future Road System Management in Africa*: The Australian Case", 14th IRF World Road Congress, Paris.

Ghana Road Fund (2007). *Inception Report*. Ministry of Roads and Highways

Ghana Road Fund. (2001). *Road Fund Act 1997 Act 536*. GTZ/GHA Road Maintenance Project.

Gyamfi, Peter, Luis Gutierrez and Guillermo Yepes. (2002) "*Infrastructure Management in Latin America and the Caribbean:* The Costs of Neglect and Options for Improvement" Report No. 17, LAC Technical Department, World Bank

Gwilliam, Kenneth and Zmarak Shalizi. (1999) "*Road Funds, User Charges and Taxes."* The World Bank Research Observer, 14, 2, 159-85.

Harral, C.G. and A. Faiz, (2005). "*Road Deterioration in Developing Countries – Causes and Remedies"*, Policy Study (Washington, D.C., World Bank).

Heggie B, Ian .G, and Vickers, Piers. (2002). "*Commercial Management and Financing of Roads*. Technical Paper No. 409. World Bank, Washington, D.C.

Kumar, Ajay. (Dec. 2006) "*Assessment of Selected Road Funds in Africa*" SSATP Working Paper No. 51

Kumar, A., (2004). "*Assessment of selected road funds in Africa. Case study of Benin, Ethiopia, Ghana, Kenya and Zambia*", SSATP Working Paper No. 51 (Washington, D.C., World Bank).

Kumar, Ajay, and Fanny Barrett. (2007). "*Stuck in Traffic: Urban Transport in Africa."* Background Paper 1, Africa Infrastructure Country Diagnostic, World Bank, Washington, DC.

Fay M. I., and Yepes T., (2003). "*Investing in Infrastructure – What is Needed from 2000 to 2010*, Policy Research Working Paper No. 3102 (Washington, D.C., World Bank Infrastructure Vice Presidency).

Ministry of Transport and Communications, Lusaka. (June 1997). *Road Sector Investment Program (ROADSIP)*: 1997-2007,

Starkey, Paul, John Hine, Simon Ellis, and Anna Terrell. (2002). "*Improving Rural Mobility: Options for Developing Motorized and Non- Motorized Transport in Rural Areas*." Technical Paper 525, World Bank, Washington, DC.

World Bank, Washington, D.C.,Staff (1997) *Appraisal Report. Project to Support a Road Sector Investment Program, Republic of Zambia.*, Transport 1, Africa Region,

Zietlow, G., (2008). "*Cutting costs and improving quality through performance specified road maintenance contracts* – pilot experiences in Latin America offers lessons for Africa", SSATP Technical Note No. 14 (Washington, D.C., World Bank).

Brushett, S., (2004). *Restructuring Road management in Africa*, presentation to World Bank Transport Network (Washington, D.C., World Bank).

Carruthers, Robin, Ranga R. Krishnamani, and Siobhan Murray. (2008). "*Improving Connectivity*: Investing in Transport Infrastructure in Sub-Saharan Africa." Background Paper 7, Africa Infrastructure Country Diagnostic, World Bank, Washington, DC.

Gwilliam, K. and Kumar A. (2003). "How *effective are second generation road funds*? A preliminary appraisal", *World Bank Research Observer,* vol. 18, pp. 113-128.

Heggie, I.G., (2004). "*Commercializing Africa's Roads*: Transforming the Role of the Public Sector", SSATP Working Paper No. 10 (Washington, D.C., World Bank).

Potter, Barry. (2007) "*Dedicated Road Funds.* A Preliminary View on a World Bank Initiative." Working Paper wp/97/7. International Monetary Fund, Washington, D.C.

Ministry of Roads and Transport, Republic of Ghana, (2006) *Road Sub-Sector Policy Strategy and Investment Program*,

Pinelo, A., P. Carvalho, Y. Kamhi and A. Ghazla, (2003). "*Role of research and development in road sector reform"*, Transportation Research Board 1819 Paper No. LVR8-1140, (Washington, D.C., World Bank).

Nyangaga, F., (2001). "*Reforming road management in sub-Saharan Africa*", SSATP Technical Note No. 32 (Washington, D.C., World Bank)

Paul Larcher, (2008) "*Privatizing road maintenance in developing countries*", International Journal of Public Sector Management, Vol. 11 Iss: 2/3, pp.116 – 129

World Bank. (2007). "*Road Maintenance Initiative Matrix*." Sub-Saharan Africa Transport Program, World Bank, Washington, DC.

(Appendix)

QUESTIONAIRE

ON

ASSESSMENT OF THE ADMINISTRATIVE PROCESS IN THE MANAGEMENT OF MAINTENANCE PROJECT EXECUTION ON TRUNK ROADS

(A Case of Ghana Highways Authority, Volta Region)

This questionnaire is to assess the **administrative process in the management of maintenance project execution on trunk roads** as an academic exercise. Your responses will be anonymous; data will be combined and analyzed as a whole. Please attempt to answer all the questions and tick one which is appropriate box that best suits your perspective for each statement. Your participation in the study will be greatly appreciated.

Thank you very much for your time and assistance**.**

Please, note that any information provided would be treated confidential

Sex of Respondent:

a. Male ( ) b. Female ( )

Age of Respondents:

a. 25-29 Years ( ) b. 30-39 Years ( ) c. 40-49 Years ( ) d. 50-59 Years ( )

e. 60-above ( )

A. Respondent's Occupational Information

1. How long have you been with the Ghana Highways Authority (GHA)?
   a. Less than 5 years ( ) b. Between 5 and 10 years ( ) c. More than 10 years ( )

2. Please select one to describe what you do:

   a. Road Area Manager (RAM) ( )
   b. Regional Material Engineer (RME) ( )

c. Road Maintenance Manager (RMM) ( )
d. Regional Quantity Surveyor (RQS) ( )

B. Management of Maintenance Project Execution

3. How do you organize periodic road maintenance?
a. ensuring that well-defined system of rules, standard operating procedures and norms are in line with quality road networks every week ( )
b. monitoring and checking efficiency of road networks ( )
c. going by specific requirements of the Ghana Highways Authority ( )
d. other(s)……
……

4. Which processes are used to execute periodic road maintenance?
a. Site inspection / Handing over site ( )
b. Quality Control ( )
c. Work supervision ( )
d. Work completion ( )
e. All of the above.....……..…….
……..

5. Which practice(s) do you see as management of periodic maintenance of road?
a. The department adheres to job specialization and the division of labour in the execution of road maintenance ( )
b. Supervisors have the right to give orders and the power to exhort subordinates for obedience ( )
c. The organization has a single plan of action to guide managers and workers ( )

6. Do you agree that arrangement of departmental positions maximizes efficiency and provides employees with satisfying career opportunities at Ghana Highways Authority?
Strongly agree ( ) Agree ( ) Disagree ( ) Strongly Disagree ( )

7. Which issues & challenges affects the administrative process in the management of maintenance project execution on roads?
a. No time and Cost limits stated ( )
b. Projects are under cost or over cost ( )
c. No specific project period ( )
d. Other(s)……
……

8. Which challenges confront Ghana Highways Authority (GHA) in the maintenance of road projects?
a. Impact on quality of the road network ( )
b. Optimal resource allocation for activities ( )
c. weak disbursement system for both routine and periodic maintenance and monitoring arrangements ( )

d. other(s).....
.....

9. How do you rate the quality levels of the maintenance project execution on roads?
High ( )
Low ( )
Not Sure ( )
Please explain your answer,……
……
……

10. In your view, which is the key role of GHA Maintenance Department?
a. ensuring adequacy of revenues for maintenance needs ( )
b. ensuring expeditious collection of revenues from source ( )
c. maintenance of all National, Inter Regional and Regional roads in the network ( )
d. efficient delivery of road infrastructure services ( )
e.other(s).....
.....
.....

11. How has road maintenance in Ghana been organized?
a. by work execution and control ( )
b. by reporting and payment processing ( )
c. through field control of maintenance works ( )
d. Other(s)……
……

12. What is the key responsibility of Ghana Highways Authority?
a. planning, development, maintenance and administration of the trunk road network ( )
b. executing almost all maintenance work ( )
c. evaluating and monitoring maintenance work ( )
d. Other(s)……
…….....