

ROAD MAINTENANCE MANAGEMENT IN KANO STATE:
CASE STUDY AT KANO METROPOLITAN

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This project report is dedicated to my parents and my family for their endless support and encouragement.

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ABSTRACT

In Nigeria Road transport system is the most important means of transportation as in many developing countries. Roads are the major connecting links of states, towns, cities and villages. Nigeria has the largest road network in West Africa and second largest road network south of the Sahara with an estimated road length of 193200 kilometres. The roads have to be maintained so as to prolong its life. Without maintenance, roads can quickly fall into disrepair leading to increased costs for road users in vehicle operation, time, reliability and safety. The aim of this study is to examine the road maintenance management of Kano metropolitan roads and the possible ways of improving it. The objectives of the study are to examine the types of road defect on Kano metropolitan roads, the factors that contribute to the road defects, the road user's satisfaction on the maintenance works carried out by KARMA and to analyse the problems on road defect reporting system in KARMA. The study is conducted through questionnaires, interviews and maintenance report at the maintenance office. A total of 25 questionnaires for KARMA, KNUPDA and ministry of works personals and 53 set for the road user's were analysed using SPSS and Average Index. From the study, the types of road defect on Kano metropolitan roads are potholes, patching and utility cut patching/Reinstatement of utility openings (electricity, water, telecommunication etc.) and edge cracks. The factors that contribute to the road defects are structural failure due to poor design and construction, inadequate maintenance policy and standards and the traffic load and volume. Overall, the road user's satisfaction on the maintenance works carried out by KARMA are 'Not satisfied. The problems on road defect reporting system and documentation in KARMA is unsatisfactory. There are no proper way of addressing complaint to the agency, the complaints are only received through verbal or written which when received had to insert into computer manually. Though obviously there is no provision of computer for this task, the latter are kept in a file and sometimes may even be lost.

ABSTRAK

Di Nigeria, sistem pengangkutan jalan raya adalah cara yang paling penting dalam pengangkutan sepertimana di kebanyakan negara membangun yang lain. Jalan raya adalah medium utama yang menghubungkan negeri-negeri, bandar-bandar, dan kampung-kampung. Nigeria mempunyai rangkaian jalan raya yang terbesar di Afrika Barat dan kedua terbesar di selatan Sahara dengan anggaran panjang jalan raya sepanjang 193, 200 kilometer. Jalan-jalan perlu dikekalkan supaya dapat memanjangkan hayatnya. Tanpa penyelenggaraan, jalan raya akan cepat menjadi rosak yang boleh membawa kepada peningkatan kos bagi pengguna jalan raya dalam operasi kenderaan, masa, kebolehpercayaan dan keselamatan. Tujuan kajian ini dijalankan adalah untuk mengkaji pengurusan penyelenggaraan jalan raya metropolitan Kano dan kaedah yang sesuai untuk menambahbaiknya. Objektif kajian ini adalah untuk mengkaji jenis-jenis kecacatan jalan raya di jalan raya metropolitan Kano, faktor-faktor yang menyumbang kepada kerosakan jalan raya, kepuasan pengguna jalan raya mengenai kerja-kerja penyelenggaraan yang dijalankan oleh KARMA dan untuk menganalisis permasalahan pada sistem laporan kerosakan jalan raya dalam KARMA. Kajian ini dijalankan melalui soal selidik, temubual dan laporan penyelenggaraan di pejabat penyelenggaraan. Sebanyak 25 borang soal selidik untuk KARMA, KNUPDA, pegawai di Kementerian Kerja Raya, dan 53 set untuk pengguna jalan raya telah dianalisis menggunakan SPSS dan Indeks Purata. Dari kajian ini, jenis-jenis kecacatan jalan raya di jalan raya metropolitan Kano adalah jalan berlubang, penampalan dan penggunaan tampalan potong / Pengembalian Semula bukaan penggunaan (elektrik, air, dan lain-lain telekomunikasi) dan retak pada bahagian tepi. Faktor-faktor yang menyumbang kepada kecacatan jalan raya adalah kegagalan struktur disebabkan oleh reka bentuk serta pembinaan, dasar penyelenggaraan yang tidak mencukupi dan standard serta beban lalu lintas. Secara keseluruhannya, kepuasan pengguna jalan raya mengenai kerja-kerja penyelenggaraan yang dijalankan oleh KARMA adalah “tidak berpuas

hati”. Masalah pada sistem laporan kerosakan jalan dan dokumentasi dalam KARMA adalah tidak memuaskan. Tiada cara yang betul untuk menangani aduan kepada agensi, aduan hanya diterima melalui lisan atau bertulis yang apabila diterima terpaksa dimasukkan ke dalam computer secara manual dan kadang data ini mungkin akan hilang.

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LIST OF ABBREVIATION

KARMA	Kano State Road Maintenance Agency
KNUPDA	Kano Urban Planning and Development Agency
MMS	Maintenance Management System
CTRE/ISU	Centre for transportation research and education/ Iowa state university
IKRAM	Institut Kerja Raya Malaysia
CGS	Colorado geological survey
SFC	Sideways-friction coefficient

CHAPTER 1

INTRODUCTION

1.1 Background of the study

The importance of transport infrastructure cannot be abandoned due to the role it plays in the economic, social, and state of all countries in the world. The success and prosperity of this sector achieved attracted other sectors to be included, and therefore there is a strong relation between growth in the transportation sector and the country's economic growth as a whole (Mubaraki 2010). Transport infrastructure like all other technical facilities, needs maintenance and reconstruction so that it can serve its users' needs properly. The users' comfort and travel time are in proportional to the effectiveness of those works (Archutowska & Pieriegud 2012).

Likewise in Nigeria Road transport system is the most important means of transportation and indeed in many developing countries. This is because roads are the major connecting links of states, towns, cities and villages. It has been estimated that road transportation represents about 85% of passenger and delivery activities in Nigeria. It has been said that Nigeria has the largest road network in West Africa and second largest road network south of the Sahara with an estimated road length of 193200 kilometres (Ibochi et al. 2013). The Nigerian road network comprises Federal roads, State roads and Local Government roads (Olatunji & Diugwu 2013). The problem of maintaining those roads has been given as one of the major factors leading to accidents, increasing road user cost and decreasing the economy of this nation. As Kano state is one of the major city in Nigeria and named as centre of commerce such problem of poor road network system has been affecting the

economy of the state. To achieve effective maintenance a lot of planning, systematic and sincere implementation is required an open-minded management hierarchy, and most importantly, an efficient, dedicated and hardworking workforce.

The most important element of the highway system are the pavements. One-half of the total expenses on highway almost goes to pavement and likewise the expenditure of the pavement continues to grow as maintenance and rehabilitation are required. The valuable benefit of road maintenance is to protect the huge sum invested on the roadway. The effects of weather creating damages as well as deterioration due to aging of the roadways, material failure, design and construction faults are all taken care of in roadway maintenance program (Abdulkareem 2003). Maintenance is concerned with the road on its existing alignment. Rehabilitation, which at times is confused with maintenance, implies that there should be some attempt to cater for design defects and altered circumstances but not to reconstruct completely.

Without maintenance, roads can quickly fall into disrepair leading to increased costs for road users in vehicle operation, time, reliability and safety. If deterioration goes too far, users will be reluctant to use the road with attendant losses of the economic and social benefits the road confers (Harvey 2012).

The outcome of timely and regular maintenance in practice is to enhance the life time of the road by increasing the number of years to reconstruct the road. This has a lot of benefits, the know benefit being that it stretches the time over which the initial investment made are available and thereby provides a higher rate of return on the initial investment. In developed countries like America, a complete and detailed inspection is usually carryout at least once a year, and a drive-by inspection is executed a minimum of once per month to identify unexpected changes in the pavement condition. It is essential to provide a complete inspection of the entire road during each inspection period, because objective, accurate and frequent pavement inspection is critical to determining the location of preventive maintenance. The main purpose of this study is to assess the level maintenance management in Kano State Road Maintenance Agency (KARMA) and Kano State Urban Planning and

Development Agency (KANUPDA) in term of the repair work as well as the reporting system in the agencies. Earlier research either restricted on finding the types of defect and their factors contribute, the repair methods while ignoring the root source which is the reporting system that causes delay whereby considerable increase in the defect may arise because most of the defect are due to natural event such as rain, temperature etc. But this research takes an integrated approach of both aspects in order to find out the tentative solutions to the problems in road maintenance of the agencies.

1.2 Problem statement

Huge sums of money have been spending into road maintenance in Kano state (KGS 2015). The road is currently under the maintenance of Kano Urban Planning and Development Authority together with Kano road maintenance management agency (KARMA) under the direct supervision of the state ministry of works, housing and transport. However, these roads have been affected by a number of problems like presence of potholes, washing away of pavements, cracks, depression, shoving etc., along most of Kano metropolitan roads, with the major ones being, inadequate or poor drainage system, poor maintenance culture and inadequate finance, as can be seen in figure below, which have significantly reduced the utility of the roads(Fahad 2014).



Figure 1.1 Sample of Kano metropolitan roads

Derek et al (1986) described three main problems in maintenance. The first is inadequate financing described as inadequate budget for maintenance and sometimes when financial problem arise is the easiest part to cut off. The second is bad management which could be clarified as idleness and waste among the management personal and the third is the design, which is inattention given on which materials or element to be use and unfortunately it is uncommon at the design stage both designer and owner take maintenance as one of the design consideration. Poor design also includes the poor quality materials used (Claes Axel et al. 1996).

Kano state as a most populous and leading in commercial centre in Nigeria with many people leaving in the metropolitan and with the above problems still stand without effective maintenance management (Sanusi 2010). These have made it difficult to road users in enjoying the utility of the roads and also affect the economy of the state. Therefore this study of road maintenance management will guide the agency in finding the effective way of maintaining and managing the roads.

1.3 Aims and objectives

The aim of this research is to examine the road maintenance management of Kano metropolitan roads and the possible ways of improving it. To achieve the aim of this research, several objectives have been identified as follows

- I. To examine the types of road defect on Kano metropolitan roads.
- II. To explore the factors that contribute to the road defects
- III. To evaluate the road user's satisfaction on the maintenance works carried out by KARMA
- IV. To analyse the road defect reporting system in KARMA

1.4 Scope of the study

The research was conducted in Kano metropolitan roads, specifically those roads in urban area which covers 137 km³ and comprises of eight local government area with the population of around 3 million (Okafor et al. 2006). The scope of the research for achieving the objectives focus on the maintenance work and supervision done by Kano State Road Maintenance Agency (KARMA). Attention was given only on the road pavement maintenance excluded others categories of road maintenance facilities such as culvert, road furniture's, shoulders and median etc.

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