

## MAINTENANCES OF URBAN ROADS INFRASTRUCTURE IN A MEDIUM SIZED CITY IN NORTH CENTRAL NIGERIA

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### Abstract

*Poor designed and maintenance of urban roads in Nigeria is great obstacles to the free movement of people, freights and information. Many urban commuters are made to waste valuable period of time in their intra city movement. It is on this premise that this study examines the urban road infrastructure and how they are maintained in Lokoja metropolis, a city located in the north central part of Nigeria. In the ancient city of Lokoja, three major roads were randomly selected from three tiers of governments in Nigeria to assess the maintenance of the urban transport routes in the city. A systematic random sampling technique was employed to select an average of fifteen buildings along the road segments on the principle of one in every 20<sup>th</sup> building. In each of the residential building sampled, only one head of household is selected and interviewed on the quality of road networks, provision and their maintenance. Descriptive statistics was used to analyze the data. The finding reveals that many of the urban routes in the city do not either pedestrian walkways or roads media which compounded mobility crises in the city. Pedestrians, motorcyclists and motorists and other road users compete on urban routes for their day to day transactions. Further analysis shows that more than 60% of urban routes in Lokoja have non drainage system. Those roads that have drainage facility have been filled up by sand from the erosion activity. Many urban routes have no traffic light. The erratic power supply has made it difficult for urban commuters to travel in the night. The study therefore concludes that further research needs to be conducted on the designing of the urban road networks in Nigeria so as to achieve sustainable transport development.*

**Keywords:** urban roads, drainage, pedestrian walkway and trafficlight

## 1. Introduction

Transportation plays a significant role in socio-economic and political development of any country of the world. It enhances the evacuation of goods from the producers to the ultimate consumers, overcome the friction of distances, promote business transactions and improve the standard of living of the people of the country who have well developed functioning and efficient transport system. These include road, rails, water and air transport. Of all the modes, road transportation has been the most utilized in Nigeria's urban transportation system (Oni, 2004). It is pertinent to note that as at 1995, it was estimated that the road network in Nigeria had an asset nominal replacement value of almost 20billion US Dollars. The annual loss due to bad roads is valued at N80 billion, while additional vehicle operating cost resulting from bad roads is valued at N53.8 billion, bringing the total loss per annum to N133.3 billion (Oni, 2004; Arizona-Ogwu, 2008). This figure excludes the hours lost on roads due to traffic congestion, physical and psychological trauma people pass through during their trips (Arizona-Ogwu, 2008). Also, Arizona-Ogwu (2008) affirms that only 10% of the fund requested by the Federal Ministry of Work and Housing was released by the federal government between 1999 and 2002. This is an indication of nonchalant attitude towards road maintenance in the country. To worsen the mobility crises in Nigeria, railway system which was designed in 1908 in Nigeria to enhance the movement of bulky goods has collapsed in the 80's due to corruption, politics and poor management.

An overview of intra-city movement in Nigeria reveals that more than 80% of urban trips are made on road and commuters depend on foot for short distances, while public transport modes (para-transit) are patronized for long distances (Adetunji, 2013; Ogunsanya,2004). Incidentally, the designing of urban transport routes in Nigeria did not consider the pedestrian walkway, and other transport facilities such as street lights, fly overs, drainage and many others which are germane to easing the movement of people, goods and information during intra-city movement. It is important to note that the provision of these road transport facilities enhances the free flow of vehicular transport and guarantees the safety of pedestrians and other road users. For instance, the design of pedestrian walkways help to provide access for all types of pedestrian travel to schools as well as work, parks, shopping areas, transit

stops and other destinations<sup>1</sup>. A study of the California SRTS programme has shown that providing sidewalks is one of the most effective engineering measures in encouraging children to walk to school (Boarnet et al, 2005).

Similarly, the provision of street light is equally important as this will enable commuters to see each other clearly and ensure safety to make their trip easier during the night journey ( Pegrum, 1972; Freedman et al, 1975) . It is disheartening that in some of the African countries, most especially in Nigeria, some engineers and architects who copied the road network design in developed countries into urban centres in Nigeria do not consider these specifications during road construction. This invariably poses some treat to pedestrians and motorists on highways. It is on this premise that this study is designed to examine the existence and maintenance of transport infrastructure in Lokoja, the first administrative headquarters of the Northern Nigeria during the colonial era.

## 2. Study Area

Lokoja metropolis is the study area and it is located on the confluence of River Niger and River Benue. The built up area of Lokoja is located in the eastern parts of River Niger, while the surrounding rural communities in the city are located at the western part of River Benue. These two rivers serve as mode of transport to Lokoja by rural communities living at the riverine areas of the state. According to Olawepo (2009), Lokoja became the headquarters of Kogi Local Government Area as far back as 1976 and was later made Kogi State capital in 1991. Since then, there have been massive changes in all activities of Lokoja, including its size, structures, population and other socio-economic status. Within the last three decades, Lokoja metropolis like many other urban centres in Nigeria has witnessed tremendous population increase. The phenomenon increase in the population over the years has put more pressure on road transport system, which is the principal mode of transportation in Lokoja and many other cities in Nigeria.

Three types of road networks are found in Lokoja. These are Trunk A- Federal Roads (highways), Trunk B- State Roads, and Trunk C- Local Government Roads. The Trunk A Roads comprise the federal highway that connects Lokoja to other towns and states of the federation. The Trunk B- State Roads are those that link the built –up areas in Lokoja where different activity centres are taking place on daily basis. The last category of urban route in Lokoja metropolis is Trunk C- Local Government Roads, which connect residential neighborhoods and low density area of the city. Some of

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<sup>1</sup> <http://guide.saferoutesinfo.org/engineering/sidewalks.cfm>

these roads are earth surface roads, with no drainage and other route transport facilities. It is against this background that this study was designed to examine the provision, utilization and maintenance of transport infrastructural facilities in Lokoja, a former capital territory of Northern Nigeria during the colonial administration. This will enable the urban planners, policy formulators, government and other stakeholders to develop an appropriate transport policy that will cater for the designing and maintenance of transport infrastructure for Lokoja and other similar cities in Nigeria.

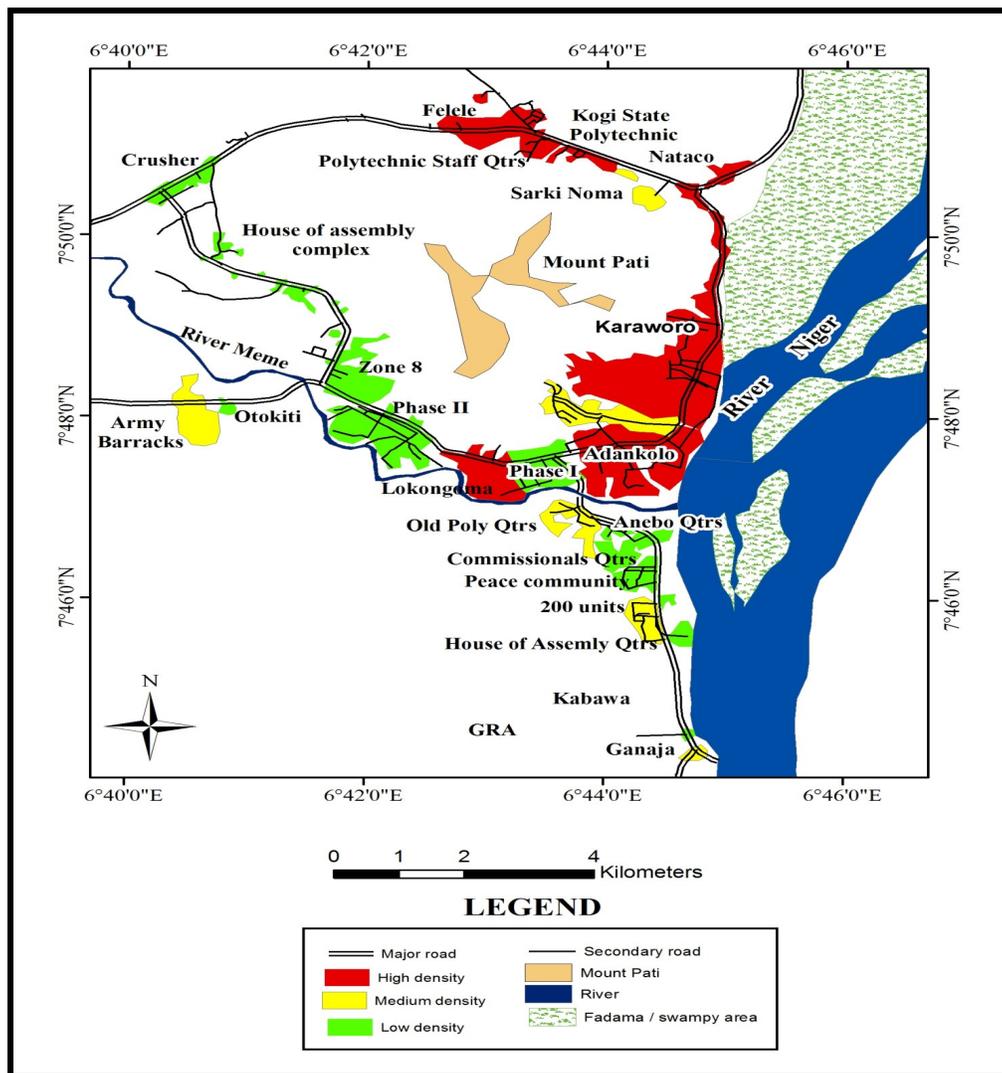


Figure 1 : Map of the Study Area

### 3. Materials and Methodology

Primary and secondary sources of data were used for this research. Two main sources of primary data were employed, namely, household survey and measurement of pedestrian walkways. Also, field observations were equally adopted to check the functionality of drainage system as well as the condition of road surface on the sampled routes in the study area. The household survey was carried out in the first week of May, 2014, using structured questionnaire to solicit information on the households' perception on the provision, utilization and maintenance culture of transport infrastructure connecting their residential units. In an ancient city of Lokoja, where the research was conducted, three roads each were randomly selected from Trunk A-Federal Roads (highways), Trunk B-State Roads, and Trunk C- Local Government Roads to assess the maintenance of the urban transport corridors in the city. This implies that information was collected on nine roads selected from all areas of the city. In each of the sampled road, a systematic random sampling technique was employed to select an average of fifteen buildings each along the selected road segments on the principle of one in every 20<sup>th</sup> building. In each of the residential building sampled, only one head of household is selected and interviewed. Once the initial household has been selected for questionnaire administration, others follow in sequential order. Descriptive statistics such as tables of percentages was used to analyze the data.

### 4. Data Analysis and Discussion

#### 4.1: Characteristics of Roads transport Infrastructure in Lokoja

The findings reveal that three categories of road networks are found in Lokoja metropolis. These include Trunk A-Federal Roads (highways), Trunk B-State Roads, and Trunk C- Local Government roads (Table 1). The Trunk A routes is federal highways that connect Lokoja with other towns or states of the federation. These include Abuja- Lokoja route, Lokoja- Ajaokuta / Ganaja road and Muritala Muhammed way. These routes are dual carriage way, well tarred with bitumen and motorable throughout the year but with numerous potholes on them in nearly every two electric poles along the road segments. The pedestrian walkways are completely absent along these major routes except from Ganaja junction- Bank of the North where the pedestrian walkway of less than 3metre is designed. The resultant effect of non-

consideration of pedestrian's walkway, Zebra crossing and fly overs by Nigerian engineers and architects during road constructions constitute conflict between pedestrians and vehicular traffic. The utility of provision of sidewalks on road transport networks are documented elsewhere. For instance, research commissioned for the Florida Department of Transportation in 2005, reveal that in Florida, the Crash Reduction Factor resulting from installation of sidewalks average 74% (Gan Albert; Joan Shen, Adriana Rodriquez (2005) In a similar study, the U.S. Department of Transportation, University of Carolina, affirmed that presence or absence of sidewalks and the speed limit are significant factors in the likelihood of a vehicle/pedestrian crash. Sidewalk presence had a risk ratio of 0.118, which means that the likelihood of a crash on a road with a paved sidewalk was 88.2 percent lower than one without a sidewalk (McMahon, et al, 2002). Further analysis reveal that Trunk B- State Roads are those routes that link different urban land use activities centres such as residential, commercial, public and recreational land uses. Notable numbers of these routes are Taiwo Road- Post Office, Stadium Road, Ado Ibrahim Road, Beach Road, Adankolo Roads, Aliu Attah Roads, Jane Ekundayo Road, Hassan Katisina Way/ Zone 8 - Crusher and Sule Oyidi Street. Some of these routes are tarred with one lane except, Hassan Katisina Way- Crusher and Taiwo Road that have dual carriage ways. Also, some parts of the length of Janet Ekundayo route are dualized. Initially, some of these roads had good drainage system but today more than half of them have been blocked by sand from erosional activities. Also, some of these roads drainage have been filled up by waste generated by urban residents in Lokoja metropolis. The Trunk C –Local Government Roads are those that link residential units as well as low density part of the city. The last category of this route has earth surface roads, with little or no drainage system, no pedestrian walkway and others transport infrastructure.

**Table 1: Characteristics of Roadway in Lokoja Metropolis**

Roadway	Number of Lane/ Width of Road	Road Surface and Drainage
<b>I Trunk A-Federal Roads(highways)</b>  (i) Abuja-Lokoja route,  (ii) Lokoja- Ajaokuta / Ganaja road  (iii) Muritala Muhammed way.	Dual carriage way    Dual carriage way   Dual Carriage	Well tarred with smooth surface in some parts of the length, but with conspicuous numerous potholes, erosional sand has encroached the road surface particularly at Kogi State Polytechnic, No drainage  Tarred with smooth surface, Non-pedestrian walkway, partial drainage  Partially smooth surface, numerous potholes, partial pedestrian walkways
<b>II. Trunk B- State Roads</b> (i) Adankolo Road  (ii) Cemetery Road	One single lane road   One single lane road	Fairly smooth surface, Partial drainage facility filled up with sand and household waste generated  Tarred, smooth surface, Partially blocked drainage facility, no pedestrian walkway

<p>(iii) Karaworo Road/ Palace Road</p>	<p>One lane</p>	<p>Earth surface road, rough surface, no drainage , no pedestrian walkway</p>
<p>III. Trunk C –Local Government Roads</p> <p>(i) Sango Daaji Palace Road</p> <p>(ii) First Gate- Phase Two Housing Estate- Arigbede Secondary School road</p> <p>(iii) Lokongoma Phase One Gate route- Chavid Hotel</p>	<p>One single lane</p> <p>One Single Lane</p> <p>One lane</p>	<p>Earth surface road, rough surface, no drainage facility, No pedestrian walkway</p> <p>Earth surface road, rough, no drainage facility, no pedestrian walkway</p> <p>Fairly smooth surface, partial drainage, many potholes</p>

*Source: Author's Field Survey, 2014*

#### 4.2 Road Maintenance Culture

Generally, three tiers of governments, namely, federal, state and local governments are responsible for road construction, rehabilitation and maintenance in Nigeria. The divided responsibility in road maintenance among the three tiers of government has adverse effects on the quality of road transport infrastructure. On several occasions, many of the intra-city roads which have reached deplorable conditions are left for federal government to maintain. Sometimes it is very difficult to differentiate between, Truck A- Federal, from Truck B- State and Truck C-Local Government Roads in urban centres in Nigeria and these tiers of government often shift their responsibility to one another for maintenance of road transport infrastructure. Lokoja Metropolis is not exempted from this problem. Table 2 reveals

that 10.7% of the road transport infrastructure in Lokoja are constructed and maintained by the Federal government, 55% of these roads are maintained by the State government, while, 34.3% are shared by both the Local government and community who live at the city suburb in Lokoja metropolis.

**Table 2: Agency responsible for Road Construction and Maintenance in Lokoja**

Road Construction & Maintenance	Percentage of Contribution
Federal Government	10.7%
State Government	55 %.
Local Government/Community	34.3%
Total	100.0%

*Source: Author's Field Survey, 2014*

#### 4.3 Road Drainage Facility in Lokoja

Efficient and well-functioning drainage facility is the most important factor to be considered in road design and construction. The Truck A- federal roads in Lokoja have partial drainage; some of these drainage facilities are blocked by sand from erosional deposits and waste generated by urban dwellers. Also, the Truck B- State Roads in Lokoja metropolis have drainage facility but they are poorly maintained both by the state as well as the inhabitants of the city. Table 3 reveals that 63.7% of the respondents in the city claims that they do not have functioning roads drainage facility connecting their residential unit, while the remaining 36.3% of the inhabitants indicates that they have good drainage facility.

**Table 3: Designing of Road Drainage Facility in Lokoja**

Drainage Facility	Percentage
Yes	63.7%
None	36.3%
Total	100%

*Source: Author's Field Survey, 2014*

In term of the maintenance of road drainage facility in Lokoja, Table 4 indicates that 86% of the urban residents who has road drainage facility in their neighborhoods claims that they are responsible for the maintenance of the drainage in the city, while 10.4 % of the drainage facility is maintained by the State government. Only 1.8% each of the drainage facility in Lokoja metropolis is maintained both by Local and the Federal governments respectively.

*Table 4: Agencies responsible for Maintenance of Road Drainage Facility in Lokoja.*

Agencies	Percentage
Individual member of the household	86 %
Truck C-Local Government	1.8
Truck B-State Government	10.4
Truck A-Federal Government	1.8
Total	100.0

Source: Field Survey, 2014.

Respondents were asked to indicate their frequency of cleaning and maintaining the road drainage facilities connecting their neighborhoods, Table 5 indicates that 34% of the respondent indicates that they clean their drainage on weekly basis. Another 23.4% of the respondents interacted with claims that they do the cleaning of the drainage on monthly basis; while 6.4% indicates that they do cleaning of the road drainage on every quarter of the year. Approximately, 36.2% of the habitants of the city interviewed claimed that they have never participated in cleaning of the road drainage connecting their neighborhoods. This could largely be responsible for the reason while, virtually every part of the drainage in the city is partially or totally blocked which frequently results in flooding shortly after each torrential down pour in the city.

*Table 5 : Period of Cleaning of Road Drainage in Lokoja*

Time of Cleaning of Road Drainage	Percentage
Weekly	34.0 %
Monthly	23.4 %
Quarterly	6.4 %
Never	36.2 %
Total	100.0 %

Source: Author's Field Survey, 2014

#### 4.4 Pedestrian walkway

Absence of pedestrian walkway is a major characteristic of urban roads in Nigeria. The situation in Lokoja metropolis is not different from other cities in Nigeria. An assessment of pedestrian walkways in Lokoja reveals that one Truck A -Federal road- Muritala Muhammed way has pedestrian walkway on some parts of their length ,while the remaining two major federal roads in the city have no pedestrian walkway and drainage facility. Few of the Truck B- State Roads which have pedestrian walkways are less than four metres wide, two pedestrians cannot move freely without body contact. In some places, the pedestrian walkways have been encroached by residential buildings, while it serves as walk-shops for artisans most especially road side vulgarizers. Pedestrian walkway is completely absent at the Truck C route. Some of these roads are untarred and rough, they are mostly found at the outskirts of the city.

In terms of the accessibility of urban residents to pedestrian walkway in Lokoja metropolis, Table 6 reveals that only 29.5 % of the households claim that they have access to pedestrian walkway connecting the road network in their neighborhoods or their work places. As high as 70.5% of urban residents indicate that the pedestrian walkway is not install in the road network connecting their residential neighborhoods. Some of the inhabitants interviewed have the opinions that if the pedestrian walkway is provided in the road networks connecting their residential area, they would prefer their wards to commute on foot to schools rather than allow them rely on motorcycles for their journey to schools. This observation is similar to the study of Boarnet (et al, 2005) carried out in California SRTS programme which shows that providing sidewalks is one of the most effective engineering measures in encouraging children walk to school.

*Table 6: Household Accessibility to Pedestrian Walkways in Lokoja*

Accessibility to Pedestrian Walkway	Percentage
Yes	29.5%
No	70.5%
Total	100.0 %

Source: Author's Field Survey, 2014.

With respect to the utilization of available pedestrian walkway in the city, Table 7 shows that 58.2% of inhabitants of the city indicate that they frequently make use of pedestrian walkway installed in Lokoja metropolis, while 16.4% of the residents in the city indicates that they make use of pedestrian walkway occasionally when demand arises. Almost, 25.4% of the household interviewed claims that they do not make use of pedestrian walkway provided in the city. The last category of this respondent competes with motorists and motorcyclists on intra -city movement and consequently exposes them to traffic collusion.

**Table 7: Utilization of Pedestrians Walkway installed in the study area.**

Utilization	Percentage
Occasionally	16.4%
Frequently	58.2%
Not at all	25.4%
Total	100.0%

Source: Author's Field Survey, 2014

Many of the residents who claim that they do not make use of pedestrian walkway in Lokoja express their dissatisfaction about the condition of pedestrian walkway installed in the city. Table 8 indicates that approximately 40.9% of the respondents claims that the pedestrian walkway in the city have been occupied by roadside traders or artisans, while 22.8% indicates that waste generated in the city have been deposited on pedestrian walkway. Another 36.3% of the respondents claim that pedestrian walkway has been encroached by the fence of buildings and other structural development in the city.

**Table 8: Reasons for non- utilization of pedestrian walkways in Lokoja**

Occupancy by roadside traders/ artisans	40.9%
Deposition of waste	22.8%
Encroachment by building fences	36.3%
Total	100.0%

Source: Author's Field Survey, 2014

#### 4.5 Street light

In some of the urban centres in developed countries of the world, street lights are provided along the transport corridor to illuminate areas of pedestrian activity and reduce the incidence of night traffic crashes by pedestrians and motorists and increase the vision of commuters (Pegrum, 1972; Freedman et al, 1975). However, the converse is the case in many of the medium sized cities in Nigeria where Lokoja metropolis belongs to. For instance, Table 9 reveals that 88.7% of the households interviewed claims that the street lights were not installed on the road networks connecting their neighborhoods , majority of these people in this category live in karaworo area, Adankolo street, Sango Daaji Area, Phase Two and many other parts of low density area of Lokoja metropolis. Approximately, 11.3% of the respondent indicates that street lights are provided along the roads connecting their residential unit. People in this category reside at Taiwo Road- Post Office, Stadium Road, Ado Ibrahim Road, Aliu Attah Road and Jane Ekundayo Road to mention a few. To worsen the situation, most of the street lights are not Solar powered and electric power supply is very irregular. This has made it difficult for pedestrians, motorists as well as other road users to make any meaningful night trips in Lokoja metropolis.

Apart from inadequate provision of pedestrian walkways and street light in Lokoja metropolis, there is only one fly -over and non- pedestrian crossing in the whole city. This shows that the road network in the city is poorly designed and little effort is made on the installation of road transport infrastructure that can enhance smooth trips during intra-city movement. The provision of street lights, pedestrian walkways and many other transport facilities would enhance the free flow of vehicular and non-vehicular movement in Lokoja and similar other cities in Nigeria at large.

*Table 9: Installation of Street Light*

Possession of Street Light	Percentage
Yes	88.7%
No	11.3%
Total	100.0%

Source: Author's Field Survey, 2014

## 5. Conclusions and Recommendations

Poor design and maintenance of road transport infrastructure are major characteristics of Nigerian roads. These impede the free movement of pedestrians and vehicular traffic on intra-city roads. This circumstance is becoming pronounced in Lokoja metropolis as a result of increase in its size, structure and pattern of development since its creation as the capital of Kogi state in 1991. It is against this background that this study was designed to assess the provision of road transport infrastructure and its maintenance status in Lokoja metropolis, Nigeria. Both primary and secondary sources of data were used for the study. Three major roads each were randomly selected from each of the three tiers of governments in Nigeria to assess the level of maintenance of the urban transport routes in the city. The findings reveals that many of the urban routes in the city do not either pedestrian walkways or drainage facilities. Inadequate installation of pedestrian walkways has forced the pedestrians, motorcyclists, motorists and other road users to compete on urban routes for their day to day transactions. Those roads that have drainage facilities have been filled up by sand from the erosion activity. Many of the urban routes have no traffic lights. Also, the erratic power supply has made it difficult for urban commuters to travel during the nighttime. The study therefore concludes that further research needs to be conducted on the designing of the urban road networks in Nigeria so as to achieve sustainable transport development. Also, the study recommends that the inhabitants of Lokoja metropolis should be enlightened that maintenance of road transport infrastructure is a collective responsible of all, both by the three tiers of governments and inhabitants of the city so as to achieve a sustainable city development.

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