DOI: https://doi.org/10.66884/kesj.2021.h25bc7sm

KESJ

Kaduna State University Environmental Science Journal, Vol. 2, 2020

AN APPRAISAL OF VEHICULAR PARKING SITUATION IN ORE, NIGERIA

Okosun, Senator Endurance[1]; Aluko, Eniola[2]; Iji, Solomon Oluwaseyifunmi[3]; Eno Okoko[4]; Sanni, Daniel[5]

[1]Department of Geography, Faculty of Social Sciences, Federal University Lokoja, Nigeria.

[3]Nigerian Institute of Town Planners, Ondo State, Nigeria.

[2&4]Department of Urban & Regional Planning, Federal University of Technology Akure, Nigeria.

[5]Kogi State Town Planning Development Board, Nigeria

Corresponding Author's E-mail; okosunsenator@gmail.com

Phone: + 234 8066194421

ABSTRACT

The study examines vehicular parking situation in Ore town with a view to identifying prevailing parking problems and their mitigation measures in the town. Research design was used in the study and a set of structured questionnaires; interview and field observations were used for data collection sourced from primary and secondary sources respectively. Primary sources of data were collected from residents, motorists and commuters along major roads in the study area. Adopting a Stratified random sampling technique to administer the questionnaire given that the sample elements were at different zones in the town, a total of three hundred and fifteen (315) respondents were sampled. The questionnaires were analyzed using the Statistical Package for Social Sciences (SPSS) version 20.0 and Microsoft Excel in the analysis of parking survey and computation of parking statistics in the study area. The study revealed that parking problems in Ore were brought about by so many factors namely; poor condition of major roads, proliferation of illegal On-Street parking areas, poor traffic and parking control, temporary and permanent structures constructed on the right of way of the sampled roads among others. This practice not only reduced the right of way but it also reduced existing off-street parking spaces in the sampled roads as submitted by the commuters and officers of the Ministry of Physical Planning and Urban Development (MPPUD), Ondo State and Federal Road Safety Corps (FRSC). The field survey revealed further that all the major roads in the study area were encroached and parking regulatory signs were not provided in these major roads to prevent indiscriminate on-street parking of vehicles. The study recommends rehabilitation of roads and removal of structures on the roads' shoulder, enforcement of minimum building setback bye-laws, and provision of off-street parking areas at strategic locations in the study area.

INTRODUCTION

Transportation is significant to modern and rapidly developing urbanizing societies, for without it, no society can function well. The transport system in an urban area can be likened to a blood's circulating system without which the body cannot be nourished and made to function properly (Adefolu, 1993). However, as useful as the role of transport may be in our daily activities, it has been noted to possess myriads of negative effects. In this regards, Ogunsanya (2002) reports that, transport has built cities over the years in some urban areas in Nigeria and it has gradually destroyed them. Yue (2004) observed that the usage of cars has definitely improved the efficiency of travel and flexibility. On the other hand, this has also created widespread problems, particularly in respect to the issue of poor land use and transportation planning in urban areas spaces for road traffic and parking requirement, both of which are often difficult and costly to be compromised. In most cities in sub-Saharan Africa, particularly within Central Business District (CBD), parking and parking related problems have been deteriorating with the increase in city traffic and parking demand (Okoko, 2006). More vehicles and more time are spent in looking

for parking, leading to increased travel time and traffic congestion.

Parking lots are areas designated and fixed by authority of city's management or its agents to ease inter or intra-transport systems for long or short journey of passengers. Parking lot is an essential part of the road transport system; it plays crucial role in the management of traffic and congestion. But where these lots are not authorized, they become illegal parking (Ahmend, 2013). Parking facilities are essential elements of the road transport system. Parking is one of the comprehensive components in land use appearing in residential, shopping and industrial areas, and is related to all kinds of trips (Mniach, 2006). Rodrigue (2011) observed that in a motorized city, on the average, 30% of the surface is devoted to roads while another 20% is required for off-street parking. In North American cities, roads and parking lots account for between 30% to 60% of the total surface. Parking emerged to be a serious problem in Western Europe in the 1950s; Japan from the mid-1960; Hong Kong and Singapore in the early 1970s; and the Republic of South Korea, Malaysia and Thailand in the late 1970s and 1980s (Msigwa and Bwana, 2013). With efficient management and the involvement of various stakeholders in the strategies to avoid underpricing and oversupply, however, many European cities have transformed their parking situation into an economic opportunity and valuable asset for local communities (de Wit, 2006). On the contrary, however, developing countries including Nigeria are still facing variant degrees of parking menace in their cities. According to Yue (2004), in Saudi Arabia, particularly in Damman Areas, control of parking in the central areas has been a major transport drawback. Poorly regulated parking makes government and road users pay a high cost in terms of travel time and efficiency, and cities in the country face challenge in managing parking within their CBDs and even residential areas. It was explained further that traffic congestions, parking and other negative sides induced by the use of motor vehicles are putting pressures on transport systems and the principles of town planning in the country.

The CBD of all the capital towns in Nigeria lack enough parking facilities. These inadequate parking spaces therefore make the city centres to be congested as vehicles are parked in any available space even along the roads (Ogunbodede et al, 2008). In Lagos metropolis, on-street parking, lack of parking space and poor traffic management at the road intersections were among major factors responsible for traffic congestion (Bashiru & Waziri, 2008). However, literature records that in most Southwestern Nigeria cities, illegal roadside parking and lack of geospatial information were other causes of traffic congestion (Ogunbodede & Aribigbola, 2003, Okoko 2006). Inadequate or improper management of parking spaces was among leading cause of road congestion in Lokoja (Olorunfemi, et al, 2014). In view of the foregoing background, this study aim to examine the vehicular parking situation in Ore, a nodal town and an emerging commercial hub in Ondo State, Nigeria with a view to identifying parking related problems and proffering mitigation measures to them. The objectives are to conduct inventories of roads and on-street parking spaces (physical characteristics) in the study area; conduct parking volumetric survey on selected distribution of on-street/road parking spaces; and investigate the parking provision in Ore as well as suggested parking control measures.

LITERATURE REVIEW

Parking is the act of stopping a vehicle and leaving it unoccupied for more than a brief time. Parking on one side of a road is commonly permitted, but on both sides of a road is often with restrictions. Parking facilities are constructed on most highways, to facilitate the free flow of traffic (Tim & Cherie, 2007). Parking facilities are either permanent or temporary. Permanent parking facilities are an integral part of installation on traffic and building plans. They may be either on-street or off-street parking. Temporary parking areas are established by the Military or Police to service a particular event or occasion (GlobalSecurity.org, 2015). As observed in the literature, parking

can be categorized broadly in two groups: On-street parking and Off-street parking (Okoko, 2006). On-street parking can be generally described as that vehicular parking which is located alongside the edge of the road, and where maneuvering into and out of a parking space may interact with traffic flow. It is often discouraged in congested areas, sharp bends and other areas that constitute hazards to other road users. Some definite areas are however marked and designed by the road shoulder to serve as emergency vehicle checking points and similar uses (Dukiya *et al*, 2014). Off-road parking is where the parking facility does not directly interact with the through traffic flow along a road other than at the access point between the road and the car park. This type of facility is required when demand for parking far outweighs the supply of on-road facilities and alternative parking areas are required, (Australian Standard/New Zealand Standard 2890.1, 2004).

Parking studies are performed to determine the location, use and adequacy of existing parking facilities. They can also be used to gather information for planning parking facilities. Normally, parking studies are concerned with specific problem areas and are made in an effort to improve efficiency and safety. They may be performed with origin-destination and vehicle registration studies (GlobalSecurity.org, 2015). According to Bhatti (2014), parking studies must be conducted to collect the required information about the capacity and use of existing parking facilities. Parking studies may be restricted to a particular traffic producer or attractor, such as a store, or they may encompass an entire region, such as a central business district.

In literature there are various parking studies relevant to this research work. Bhatti (2014) observed that parking studies include: inventory of parking facilities, accumulation counts, duration and turnover surveys, user information surveys and land use method of determining demand. Tom, 2014 employed parking load (average) duration as applied in this research. These studies are also known as parking statistics and they are of immense importance and relevance to this research work. As observed in the literature, there are various causes of parking problems in Nigerian cities. According to Ogunbodede & Olurankinse (2006), the central business district (CBD) of all the capital towns in Nigeria lacks enough parking facilities. By design, the CBD has a higher tendency to attract vehicles more than any other known land use in urban centers. Inadequate parking spaces, therefore, make the city centers to be congested as vehicles are parked on any available space, including the road. Similarly, Okoko (2006) reports that, there is a limited amount of land space within the CBD and there are several and varied demands for the use of this limited land area. Aderamo & Salau (2013) observed that parking problem arises due to absence of clearly designated areas for parking in many of the cities. It has led to traffic congestion and delay problems. They further observed that, illegal parking is a major problem in Nigerian urban environment and roadside parking is a common phenomenon which reduces the traffic corridors meant for the efficient movement of automobiles. The resultant effect of such illegal parking is traffic congestion which also leads to delay in travelling time and increases the cost of travelling. Parking problems become even worse in Nigerian cities as a result of ineffective regulation. It must be noted that in spite of the enormous studies that have been carried out on transport problems in many cities in Nigeria, less attention has been given to smaller towns like Ore without regards to its status as a transit and commercial town.

Parking studies and statistics

Parking and road inventories: Parking inventory is a physical count of existing parking spaces. It includes on-and off-street parking. For marked spaces, a numerical count is made. Parking inventory is similar to road inventory. According to Okoko (2006), road inventory is necessary to serve as a guide in the provision of roads in the town. Road inventory provides information on the mileage, physical characteristics and conditions of all roads in the town. It provides the transport planner with

information on such issues as the type, dimension and conditions of urban roads, classification of road by type of pavement, physical designs features such as pavement widths, grades, curvature, sight distances, location of road furniture etc. Parking usage survey was conducted in this study.

Parking Usage Survey: It is base on the number of vehicles in a specific area and the length of time vehicles are parked in the area. The survey is conducted during normal duty hours. Each parking space in an area can be check per person, once during a 15-minute period for on-street parking, and once during a 30-minute period for off-street parking. On the other hand, the observer will walk a predetermined course and record on a field sheet the license plate or decal numbers of vehicles. The same route is used at intervals of 15 to 30 minutes. Parking usage surveys are useful in determining areas with the greatest parking demand and where parking problems are critical due to inadequate capacity. They are helpful in identifying areas where time limits are not consistent with usage. This will further aid in determining whether enforcement efforts should be lessened or increased. They evaluate efficiency of parking areas. An efficiency of 85 percent is considered maximum in short-time parking areas and 95 percent is the maximum in long-time parking areas (GlobalSecurity.org, 2015). Parking usage survey was employed in this study to achieve the stated goal of the study.

Transportation and Land Use Models: Transportation and land-use interactions mostly consider the retroactive relationships between activities which are, land use-related and accessibility which is transportation related. These relationships have often been described as a classic 'chicken-and-egg' problem since it is difficult to identify the triggering cause of change. Do transportation changes precede land-use changes or vice-versa. The relationship between transportation and land-use is rich in theoretical representations that have contributed much to regional sciences. Several descriptive and analytical models of urban land-use have been developed over time with increased levels of complexity (Rodrigue, 2013). According to Torrens (2014), Land use models are used to simulate demographic and economic transition in land-based activities. These models describe the population (usually in terms of income and employment) and built-space environment. They use economics theories to explain and estimate the layout of urban land uses. Land use model is the quantitative method to predict the future changes in land use, socio-economic and demographic data base on economics theories and social behaviors (Zeng-Peng, 2014). The concentric urban land use model is of immense importance to this research work.

Concentric Urban Land Use Model: The Burgess (1925) concentric model (Figure 1) was among the first attempts to investigate spatial patterns at the urban level. Although the purpose of the model was to analyze social classes, it recognized that transportation and mobility were important factors behind the spatial organization of urban areas. The formal land use representation of this model is derived from commuting distance from the central business district, creating concentric circles. Each circle represents a specific socioeconomic urban landscape. Even close to one century after the concentric urban model was designed, spatial changes in Chicago are still reflective of such a process. The model suggests that, the city as a complex entity, often exhibits concentric pattern of growth of six notable zones, each with a distinct structure of development.

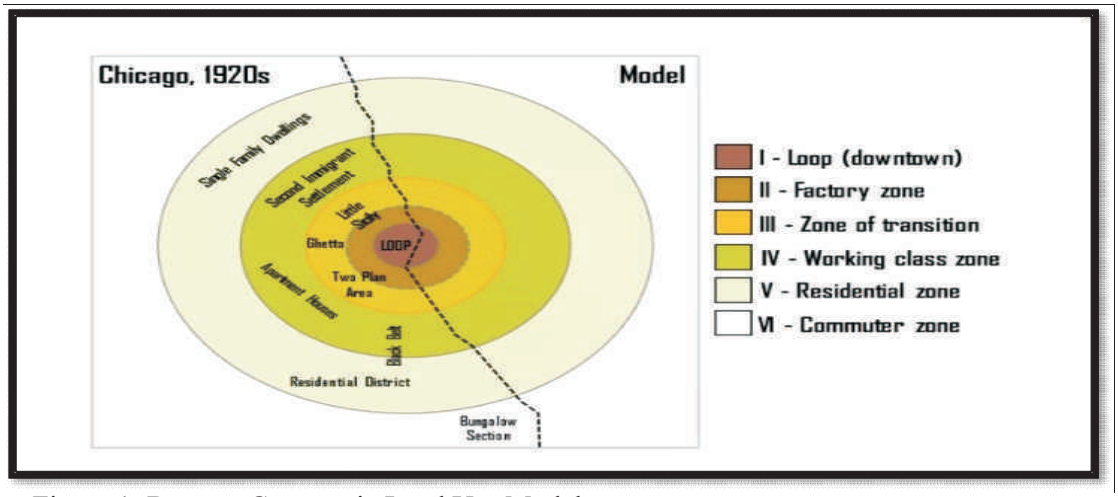


Figure 1: Burgess Concentric Land Use Model.
Source: Carter (1995).

The six distinctive zones are the inner zone, light manufacturing activities zone, transition zone, medium class residential zone, the commuter's zone and outer ring roads. The theory was therefore concerned that, there is an order of behaviour of people in response to certain circumstances as the city continues to grow. On account of daily increase in city's population at the center, people in the inner zone gradually succeed to the next outer zone.

RESEARCH METHODOLOGY

This is an in-depth explanation of the systematic approach and scientific methods employed to carry out this study. The social survey research design was adopted for this study. It is perhaps the most widely used by social scientists in the built environment (Ogunsanya, 2002, Olorunfemi et al, 2014). The research design was in three phases. These are pre-survey, survey and post survey phases. Two sources of data were explored; (i) primary and (ii) secondary sources. Basically, this study adopted both questionnaire and field observation methods to collect the required primary data. Field observation method was employed to conduct inventory of roads and on-street parking spaces in Ore town. It was also used to conduct parking volumetric survey in the study area. Data on the physical characteristics of existing roads and distribution of On-street parking spaces in the study area were collected concurrently. In addition, oral interview of some selected respondents particularly officers of the Federal Road Safety Corps (FRSC) and the motor traffic department (MTD) of the Nigerian Police Force were carried out. Secondary data in the study include existing information about the study area such as location, population, occupation among others. They also include information about the conceptual and theoretical framework and other relevant information about parking and its associated menace sourced from existing literature including published textbooks, articles, reports, Journals, Newspapers, Magazines, other published and unpublished materials, and the internet resource. In addition, secondary data were also sourced from Ministry of Physical Planning and Urban development (MPPUD), Ondo State and National Population Commission (NPC) among others. Table 1 showed the questionnaire' administration schedule for the study. The sample size adopted for the study was 50 percent of the sampling frame (630 motorists). This was considered reasonable judging from the number and statistically representative size of the target population to be sampled. From the Table, it could be observed that the sample size was 315

motorists being 50% of the sampling frame. This meant that, a total of 315 copies of structured questionnaire were administered in Ore. Stratified random sampling technique was employed to administer the questionnaire given that the sample elements were at different zones in the town. As shown in Table 1, there were 7 on-street parking areas in the study area. These parking areas were: Lagos Motor Park area, Benin Motor Park area, NNPC-Broad Street area, First Bank Area, Mobil Junction Area, Zenith Bank and Akure Motor Park area. The sampled elements in each of these parking areas were approximately 52, 35, 55, 48, 40, 43 and 42 respectively (the observed variation in number of questionnaire administered in the parking areas was as a result of differences in their size and concentration of commercial activities) being 50% of total population of motorists involving in on-street parking in each of the parking areas.

Table 1: Questionnaire Administration Schedule

S/N	On-Street Parking Spaces	Zone/Location	Population (Motorists)	Sample Size (50%)
1	Lagos Motor Park	Benin-Shagamu Express	104	52
2	Benin Motor Park		70	35
3	NNPC-Broad St. Area	Broad Street	110	55
4	Mobil Juction Area	"	96	48
5	First Bank Area	Sabo Market Road	80	40
6	Zenith Bank Area	Ore-Okitipupa Rd.	86	43
7	Akure Motor Park	Ore-Ondo Road	84	42
		Total	**630**	**315**

Source: Author's Preliminary Survey, 2018

The questionnaires were administered in situ at the different parking areas. The observed variation in number of questionnaire administered in the parking areas was as a result of differences in their size and concentration of commercial activities. Information concerning parking control measures was sourced from selected motorists in Ore and agencies of government, which includes Ministry of Physical Planning and Urban development (MPPUD), Ondo State. Further relevant information was collected with the aid of field note, check-list, measuring tape, camera, oral interviews and discussions with the respondents among others. The processing of data was analysed using Statistical Package for Social Sciences (SPSS) version 20.0 and Excel in the analysis of parking survey and computation of parking statistics in the study area. The analysis of data was discussed using frequency count; distribution and such information were presented through the use of tables, figures, percentages and charts.

RESULTS AND DISCUSSION

The findings of the road and parking space inventory conducted to identity physical features and influences on vehicular parking, their distribution, and extent of usage (parking volume) in Ore are presented below.

Physical characteristics of roads and on-street parking spaces in Ore, Nigeria

This study identified there were six (6) major roads namely: Benin-Shagamu express way, Ore-Ondo road, Broad Street, Ore-Okitipupa road, Old Lagos-Benin road and Sabo Market businesses and trading activities. Due to this reason there were high traffic

attraction and parking demand which promoted indiscriminate on-street parking at different locations on these major roads. All the major roads were used as on-street parking spaces by motorists thereby constituting parking menace in the town. The spatial distribution of these roads is shown in Figure 2. On the basis of functionality, all the roads in the town fell under different road (Table 2). These roads formed the core area where there was high accumulation. As depicted in Table 2, three of out of the six selected roads namely: Benin-Shagamu express way, Ore-Ondo road and Ore Okitipupa road were under arterial road category. They carried thorough traffic especially the expressway and they linked the town with other major settlements and states. The remaining three roads, that is, Broad Street, Old Lagos-Benin and Sabo Market road were distributor/collector road category. These roads distributed to and collected traffic from the arterial and access roads in the town. In addition, they also provided linkages between the different residential zones in the study area such as Ajegunle, Idi-Mango, Beaulah Secondary school area, reserve market.

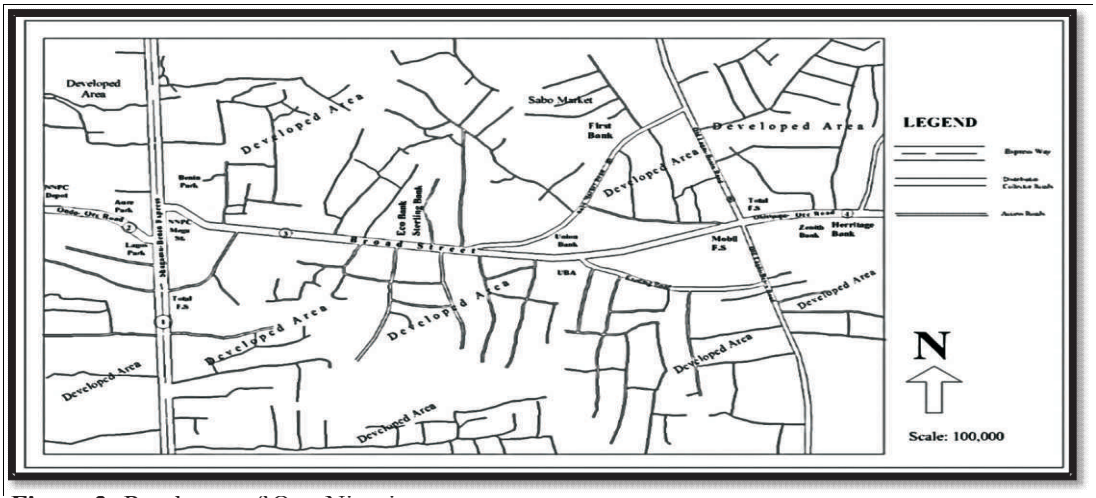


Figure 2: Road map of Ore, Nigeria.
Source: Google Earth (2018).

Finding as depicted in Table 2 showed that among the six sampled roads, only the Benin-Shagamu express way had a dual carriage way. The remaining ones were single carriage ways. It was only the Benin-Shagamu express way had 4 lanes while the rest of the roads had 2 lanes each. All the roads had two-way traffic direction except the Benin-Shagamu express that has one-way traffic. The right of way of Benin-Shagamu express was 90metres while Ore-Ondo road, Ore-Okitipupa road and Broad street were 45-50metres. The remaining two roads, that is, Old-Lagos road and Sabo market road had right of way of 18-25metres. As indicated in the Table, temporary and permanent structures were constructed on the right of way of the sampled roads. This practice not only reduced the right of way but it also reduced existing off-street parking spaces in the sampled roads. This situation disposed motorists in the study area to indiscriminate on-street parking. The study further established that, the sampled roads had Asphalt pavement but with different structural conditions. As shown in Table 2, only one of the roads, that is, the Benin-Shagamu express way was in a very good structural condition. This was as a result of the fact that the road was being newly reconstructed. Specifically, the Old Lagos-Benin road was in a bad structural condition as its surface had numerous potholes. Ore-Ondo road, Broad Street, Ore-Okitipupa road and Sabo market road were in fair structural condition as the roads had fairly smooth pavement. However, none of the sampled roads had sidewalk. From Table 2 it can be concluded that all the roads examined had their provisional shoulders encroached.

It was observed that commercial activity and business owners erected temporary or permanent structures on them. For instance, in Old Lagos-Benin road, the road shoulders were occupied by traders and street hawkers for the sales of their commodities. This practice is worrisome; it has a bad implication on the parking situation in the study area. This is because the road shoulders could have been used for off-street parking if they had not been encroached. This situation indeed created parking problem in form of parking supply deficit in the study area. In fact, parking space supply and demand in Ore could better be described as paradoxical. This was because, there was a situation where business owners completely occupied the road shoulders that were to serve among other uses as off-street parking spaces for customers, yet they displayed no parking sign post at the frontage of their buildings but were expecting customers' patronage. They forgot that their business activities attracted customers and vehicles which require parking spaces. Furthermore, there was no parking regulatory sign along the sampled roads. Conventionally, traffic and parking are regulated through the use of various regulatory signs put on specific sections and surfaces of the road way. They are popularly known as Highway Code. Observation showed that none of the roads in the study area was provided with any of the highway codes. As observed, none of the roads' surface was marked with yellow or red paint/mark in order to control parking. This condition gave room for indiscriminate on-street parking which is a serious parking problem in Ore. Finding reveals that there is a clear indication of lack of concern for traffic and parking management by relevant government agencies in Ore.

Table 2: Physical Characteristics of Major Roads in Ore

S/N	Road Name	Type	CW	Lane's Width(m)	NTL	SO	RoW (m)	Pavement Type	SC	NIL	Side Walk	Sewer	Shoulder	SL	TS
1	Shagamu-Benin Exp.	Arterial	Dual	3.7	4	1	90	Asphalt	V. Good	4	Nil	Yes	Nil	Nil	Nil
2	Ore-Ondo Road	Arterial	Single	3.7	2	2	45-50	Asphalt	Fair	3	Nil	Nil	Partly	Nil	Nil
3	Broad Street	Distributor	Single	3.7	2	2	45-50	Asphalt	Fair	4	Nil	Yes	Nil	Yes	Nil
4	Ore-Okitipupa Road	Arterial	Single	3.7	2	2	45-50	Asphalt	Fair	4	Nil	Yes	Nil	Yes	Nil
5	Old Lagos-Benin Road	Distributor	Single	3.7	2	2	18-25	Asphalt	Bad	4	Nil	Partly	Nil	Nil	Nil
6	Sabo Market Road	Distributor	Single	3.7	2	2	18-25	Asphalt	Fair	3	Nil	Partly	Nil	Nil	Nil

CW=Carriage Way, NTL=No. of Travel Lanes, SO=Street Operation: 1=One -way traffic, 2=Two -way traffic, RoW=Right of Way, SC=Structural Condition, NIL=No. of Intersection Legs, SL=Street Lighting, TS=Traffic Signs.

Source: Authors Fieldwork, 2018

Distribution of on-road parking spaces in Ore, Nigeria

The study established that there were seven (7) on-road parking areas namely; Akure Motor Park area, Lagos Motor Park area, Benin Motor Park area, NNPC-Broad Street area, First Bank area, Mobil Junction areaand Zenith Bank area in Ore (Table 3). The parking areas were illegal and were located along the roads depicted on the Table 2. However, from Table 3, it can be established that the dominant land uses around majority of the on-street parking areas were transport and commercial activities which promoted illegal on-street parking in the study area.

Table 3: Distribution of On-Street Parking Spaces in Ore town

S/N	Name of Area	Zone/Location	Dominant Land Use	Road Sides Used	Sited on Road Intersection	Parking Sign
1	Akure Motor Park	Ore-Ondo Road	Transport/Comm.	2	✓	-
2	Lagos Motor Park	Benin-Shagamu Exp.	"	"	-	-
3	Benin Motor Park	"	"	"	-	-
4	NNPC-Broad Street	Broad Street	"	"	✓	-
5	Mobil Junction Area	Broad St./Okitipupa Road.	"	"	✓	-
6	First Bank Area	Sabo Market Road	"	".	-	-
7	Zenith Bank Area	Ore-Okitipupa Road	"	"	✓	-

Source: Author's Fieldwork, 2018.

From table 3, it was also observed that all the on-street parking spaces were on-street motor parks or lading points due to deficit of off-street parking spaces in the study area. In addition, the dense cluster of commercial activities abutting the on-street parking spaces enormously attracted traffic that equally increased demand for parking spaces which resulted to indiscriminate on-street parking mostly during the peak period in the town. This situation reduced the width of roads and caused traffic congestion and accidents. Moreover, the situation eroded the town of its aesthetic values. As shown in Table 3, both sides of the roads were used in all the illegal on-street parking areas. This practice further led to a drastic reduction of the width of the roads where the parking spaces were located. Four out of the seven parking areas, that is, Akure Motor Area, NNPC-Broad Street, Mobil Junction area and Zenith Bank area were sited on road intersections. This posed serious challenge for smooth intra urban travel around those locations. The four parking areas constituted serious traffic flash points that require urgent attention. Furthermore, parking signs were not

available in all the on-street parking areas, a situation that promoted proliferation of on-street parking in study area.

The extent of usage of on-road parking spaces in Ore, Nigeria

This section showed the findings of the parking volumetric survey conducted in the study area in order to assess the extent of usage of selected on-road areas as presented below.

Parking volume

Presented in Figure 3 is the daily average vehicular parking volume of selected on-street parking spaces namely in Ore (Figure 4). The study revealed that a total of 611 vehicles parked daily in all the sampled on-street parking spaces. As shown in the graph, parking volume was high in all the parking area but the peak volume occurred at Lagos Motor Park area (16.69%) and NNPC-Broad street parking areas (16.53%). This meant that the two parking spaces had the largest volume of vehicles. This was as a result of high concentration of transportation and commercial activities; the dominant land uses in the two parking areas. It implied that parking problems such as traffic congestion and accidents might equally be higher in these parking areas. The least parking volume (11.28%) occurred at Benin Motor Park area. Commercial activities were at low concentration and there were reduction in parking volume, hence was minimum in this location.

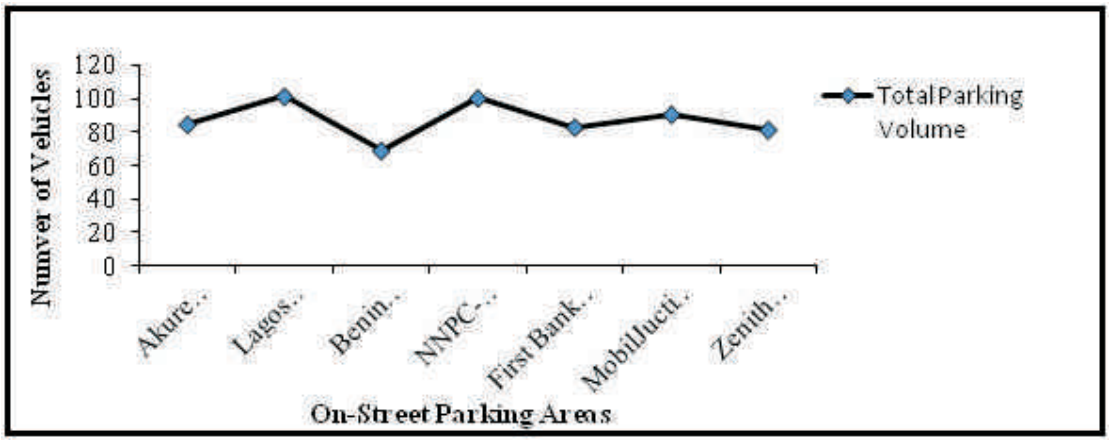


Figure 3: Parking volume of selected days of the week in Ore, Nigeria
Source: Author's Fieldwork, 2018

From Figure 4, it can be established that 53% of the vehicles were cars and buses; 10% was articulated vehicles and Lorries and lastly 37% were motorcycles and tricycles. It can be inferred from this finding that cars and buses were the dominant type of vehicles parked in the sampled on-street parking areas. This showed the due to dominance of this category of vehicle as mode for both private and public intra/inter-township travel in the town. Motorcycles and tricycles popularly known as Okada had considerable volume and were next to cars and buses. This mode of travel provided flexible and convenient public intra-township travel services leading to its growing popularity as a mode of travel in the town. Articulated vehicles and Lorries had the least volume. They were mostly used for haulage purposes and not for intra-urban travel and they required considerable parking spaces due to their dimensions. These were reasons their

parking volume was quite low compare to the rest categories of vehicle in the various parking areas. From these findings, cars and buses constituted the major parking problems in the study area. The volume of articulated vehicles in the selected parking spaces as depicted in Figure 5 was however remarkable. About 47% of the articulated vehicles parked in the parking spaces under review were found in Lagos Motor Park area. The remaining 6 parking areas had less than 20% each. This implied that Lagos Motor Park area had the largest volume of articulated vehicles and Lorries (Plate 6). The location of the parking area on the express way was responsible for this, that is, the Shagamu-Benin express way in the town. Articulated and others heavy duty vehicles parked along the express way for fuel refill, repairs, stop-over, shopping, loading among others. However, the concentration of this category of vehicle on one or both sides of the express way was a menace in the study area. The practice led to reduction in the roadway thereby reducing travel speed and caused traffic congestion and accident especially during parking maneuvering.

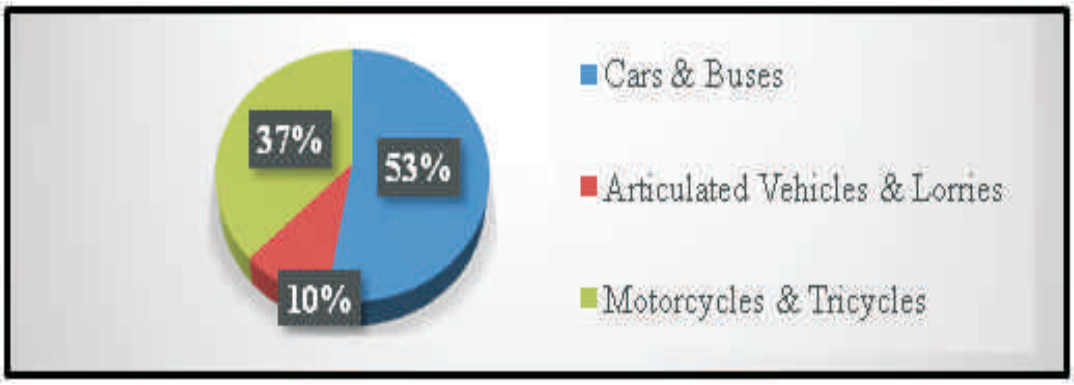


Figure 4: Distribution of vehicle types at selected on-street parking spaces in Ore

Source: Author's Fieldwork, 2018

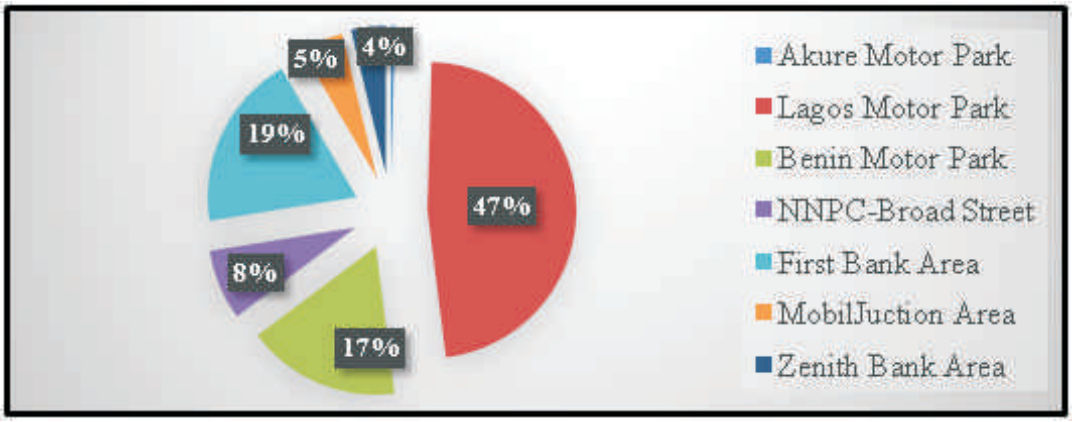


Figure 5.Volume of vehicles/lorries at selected on-street parking spaces in Ore.

Source: Author's Fieldwork, 2018



Plate 1. On-street parking of articulated lorries along Shagamu-Benin Express, Ore
Source: Author's Fieldwork, 2018

4.3.2 Parking volume on selected days of the week in Ore, Nigeria

The information presented in Figure 5 is the on-street parking volume of vehicles on selected days of the week in the study area. These days were Monday, Wednesday, Friday and Saturday. The essence of the survey was to determine the variation in parking volume on these selected days. According to findings, there was only slight variation in the parking volume among the days of the week. In essence, parking volume was almost the same in selected days of the week. The reason is due to the fact that most of the parking areas were on-street motor parks and there was high concentration of commercial activities around them. The implication of this finding was that, parking related problems such as traffic congestion and accident were almost of the same magnitude in all the days of the week in the study area. However, it was established that the parking volume was slightly higher on Friday and Saturday than on Monday and Wednesday.

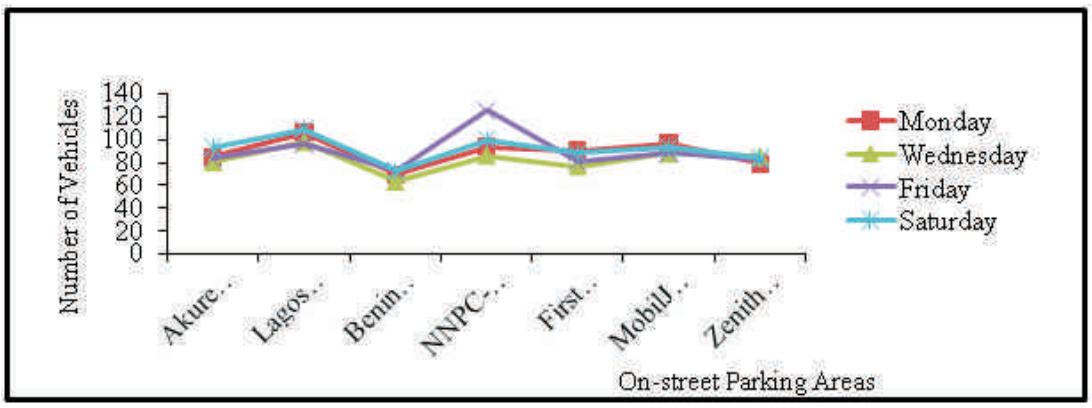


Figure 5. Parking volume of selected days of the week in Ore, Nigeria
Source: Author's Fieldwork, 2018

Parking load of on-street parking areas in Ore, Nigeria

Parking load is expressed as vehicle-minutes or vehicle-hour. This is computed simply by multiplying the number of vehicles occupying a given parking area with parking time interval. It simply gives the area under the parking accumulation of each sampled parking area. Figure 7 is a bar graph showing the daily average parking load of the sampled on-street parking areas. As can be seen in the Figure, the parking load was large in all the sampled parking areas with an average of 317 vehicle hour. This meant that the sampled parking areas were intensively used. Lagos Motor Park area with 18% had the largest parking load. It indicated that this parking area was the 9most intensively used

by motorists in the study area. It further implied that parking problem was at its peak in this area. However, Benin Motor Park area with 10% had the least parking load. This similarly implied that this parking area had the lowest usage and parking related problems were at minimum in this location.

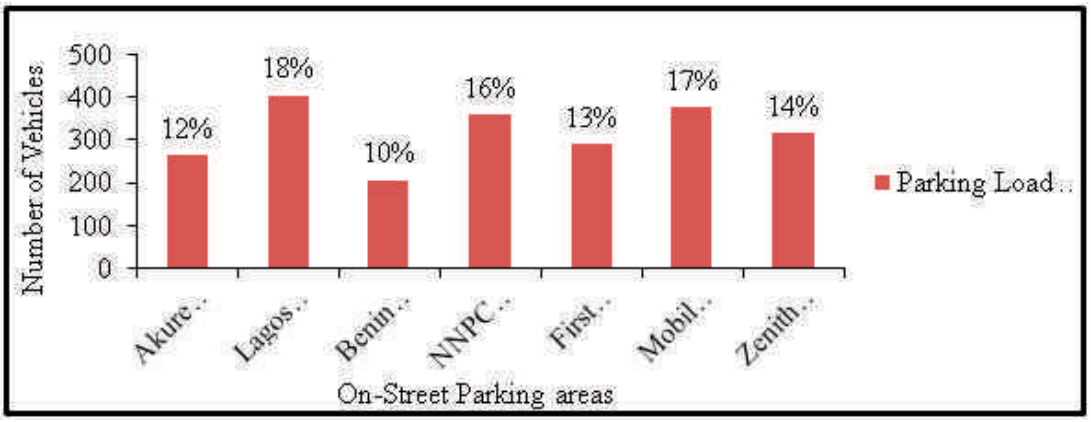


Figure 6. Parking load of on-street parking areas in Ore, Nigeria
Source: Author's Fieldwork, 2018

Suggested parking mitigation measures

Table 4 provides information concerning parking control measures suggested by selected motorists in Ore. From the Table, traffic control and management; and provision of off-street parking spaces were the dominant measures suggested by the selected motorists to address parking related menace in the town. Noticeably, there was little being done in this regards unlike other major cities like Akure, Ado-Ekiti, Lagos to mention few where parking management was taken as a serious business. In these major cities there were reasonably pragmatic and concerted efforts aimed at ensuring effective traffic management in order to discourage indiscriminate on-street vehicular parking in those cities.

Table 4: Suggested parking mitigation measures in Ore, Nigeria

Mitigation measures	Frequency	Percentage
Provision of Off-Street Parking Spaces	85	27
Effective traffic and Parking Control Measures	118	37
Effective development Control Measures	38	12
Public enlightenment to Motorists	31	10
Demarcation of section of the roads for On-street Parking	43	14
Total	315	100

Source: Author's Fieldwork, 2018

CONCLUSION

This research has revealed that the vehicular parking situation in Ore is problematic and appalling. The study revealed that the dominant parking challenges in the town were mostly traffic congestion and accidents. The ugly situation is brought about by several factors such as poor parking and traffic management, deplorable condition of roads, proliferation of On-Street parking areas. Traffic congestion and accidents were common place effects of parking problems in the study area. The prevailing parking condition in Ore hinders

smooth inter and intra-urban mobility especially within the core area of the town. It reduces accessibility to corporate institutions and major activity areas in the town. The field survey revealed that all the major roads in the study area were encroached and parking regulatory signs were not provided in these major roads to prevent indiscriminate on-street parking of vehicles. Major roads in Ore were in deplorable structural condition and were mostly narrow. There was proliferation of illegal on-street parking areas along the major roads which were majorly on-street/road motor parks and loading points. The study recommends rehabilitation of roads and removal of structures on the roads' shoulder, enforcement of minimum building setback bye-laws, and provision of off-street parking areas at strategic locations in the study area in order to arrest the ugly development in the town. Governments through their relevant agencies have major roles to play in this regards; including motorists, road users and owners of business activity or properties. This is because; Ore is a strategic settlement in Ondo State with a lot of business and development potentials. Thus, a concerted effort made to halt the emerging poor parking experience in the town will benefit the residents of Ore, Nigeria. Therefore this is the need to effect parking control and management in the study area. Parking regulatory signs should be provided at designated sections along major roads in the study area. Relevant traffic control agencies and the Police should be empowered and equipped to enforce parking control and other relevant conventional regulations. Fines for traffic offenders should be determined and stated in clear terms. The fines should be reasonable and correlate with the prospective offenses. Public enlightenment should also be conducted for motorists particularly commercial vehicle operators in Ore. They should be taught periodically the proper ways the roads should be used. Minimum building Setback should be enforced by the town planning authority especially within the core area of Ore. This singular action will make available considerable amount of off-street parking spaces. This in turn will reduce the number of vehicles being parked on-street in the study area. Related to this is the need to prohibit on-street trading and hawking in the core area during the rush hours. Public designated off-street parking facilities should be provided in the study area in order to reduce the volume of on-street parked vehicles. The planning authority in Ore should specify and enforce the provision of parking space in connection with new building. The owners of existing buildings in the CBA in the town should be mandated to refurbish them in order to provide adequate parking space. Like the types provided in Akure, designated off-street parking spaces could be provided at strategic locations within the core area to ease parking menace in the town.

REFERENCES

Adefolu, A.A. (1993). *Bottleneck and other constraints to traffic flow in the Lagos Metropolitan area*. Nigerian Transport Handbook and Who's who media Research, pp. 205-213.

Aderamo, A.J. & Salau, K.A. (2013). Parking Patterns and Problems in Developing Countries: A case from Ilorin, Nigeria. *African Journal of Engineering Research,* 1(2), pp.40-48.

Ahmend, A.Y. (2013). Menace of Illegal Motor Parks in Nigerian Urban Environment: Example from Ilorin City. *Journal of Urban and Regional Planning,* 8(2), pp. 37-46.

Australian Standard/New Zealand Standard 2890.1. (2004). *Parking Facilities, Part 1: Off-street car parking*. Sydney, NSW: Standards Australia and Standards. New Zealand.

Bashiru, A.R.& Waziri, O.O. (2008). Analysis of Intra-Urban Traffic Problems in Nigerian

Cities: A Case of Lagos Metropolis. *Indonesia Journal of Geography,* 40(1), pp. 31-55.

Bhatti, M.B. (2014). *Parking Studies for Provision of Parking Lots* [An Online Book on Parking Studies]. Retrieved from https://www.linkedin.com/pulse/parking-studies- provision-lots- bhatti, 2015.

Burgess, E. (1925). The growth of the city: An introduction to a research project. In Park, R.E. *et al.* (Eds.). *The City Chicago.* Chicago: University Press.

De Wit, J.G. (2006). Hub Development at Amsterdam Airport Schiphol. In *Hub airport Strategies &cases in 21st century* (pp. 95-122). Incheon: University of Incheon.

Dukiya, J.J., Zubairu, S.N. & Ayuba, P. (2014). The Problems of Articulated Vehicles on road parking at Mokwa and Tegina in Niger State, Nigeria. *Herald Journal of Geography and Regional Planning,* 3(1), pp. 16-22.

Global Security. (2015.). P*arking Studies.* Retrieved from http://www.globalsecurity.org/military/library/policy/army/fm/19-25/CH27.htm

Google, Earth. (2016). Ore town map. Retrieved on 15th of January, 2018 from google.earth.mp.com.

Mniachi, A. (2006). Time Use Differentials by Hierarchy of Household Members. Country Wide Time Use Survey.

Msigwa, R.E. & Bwana, K.M. (2013). Parking Challenges Facing Urban Cities in Tanzania. Evidence from Das es Salaam City. *Journal of Economics and Sustainable Development.* 4(15). Ogunbodede, E.F. & Olurankinse, F. (2006). Reducing Mobility Barriers for Sustainable Intra-Urban Transport Development in Nigerian cities. *Journal of Geograpphy and Planning Sciences,* 2(1), pp. 40-50.

Ogunbodede, E.F., Olurankinse, F. & Ilesanmi, A.O. (2008). Luxurious Buses as a Means of Night Journey in Nigeria: Challenges and Implications for Transportation Planning. *Ethiopian Journal of Environmental Studies and Management.* 1(3), pp.52-62.

Ogunsanya, A.A. (2002). *Maker and Breaker of cities. 59th Inaugural Lecture*. University of Ilorin, Ilorin; Nigeria.

Okoko, E. (2006). *Urban Transportation Planning and Modeling.* Akure, Nigeria: Millennium Publishers.

Olorunfemi, S.O., Olowosegun, A., Koffi, A.E., Okoko, E.E., & Mobolaji, S. (2014). Examination of On-Street Parking and Traffic Congestion Problems in Lokoja. *Journal of Civil and Environmental Research,* 6(4).

Rodrigue, J.P. (2011). Transportation and Urban Form. Geography of Transport System. *An Online Textbook Authored by Jean-Paul Rodrigue.* Department of Economics and Geography, Hofstra University, New York.

Tim, S.and Cherie, U. (2007). *Parking control Manual, Land Transport* (Part 13). New Zealand.

Yue, W.L. (2004). *Parking Management in Saudi Arabia: Is there any Solution?* [27th Australasian Transport Research Forum, Adelaide. Australia: Transport System Centre, University of South Australia.

Zong-Ren, Peng. (2014). Overview of Land Use Modeling Review. United State. Department of Urban and Regional Planning, University of Florida.