Vehicular Parking Imbroglio in Nigerian Cities: Ore Town as a Case in Point

Okoko, E.
Iji, S. O.
Solomon-Ayeh, B.

ABSTRACT

This paper reports the result of the research on on-street vehicular parking situation in Ore town, Nigeria. The study relied on the survey research technique to collect data on the geometric conditions of the major roads in Ore town, the existing on-street parking spaces and the parking volumetric situation. The study revealed that parking problems in Ore were caused by a myriad of factors, exampli gratia, the poor physical condition of the major roads, proliferation of illegal on-street parking areas and poor parking control mechanism. The study also discovered that the haphazard parking situation in the town was responsible for the incessant cases of traffic snarl and vehicular accidents. The study advanced some policy-oriented recommendations such as rehabilitation of roads, removal of structures located on the road shoulders, enforcement of minimum building setback bye-laws and the provision of off-street parking facilities at strategic locations in the study area. Ultimately, the study recommended the formulation and implementation of efficacious traffic control legislation as well as the creation of off-street parking facilities in Ore town.

Keywords: parking, on-street, off-street, Ore, Nigeria.

INTRODUCTION

The usage of vehicles has a direct linkage with parking. This is so because after a vehicle is driven to a destination, its usefulness evanesces. Parking is an essential component of the transport system because every vehicle must park at a destination. Availability of parking facilities therefore affects the efficiency of the transport delivery system (Tom, 2014; Okoko, 2018). The criticality of parking encumbrance has now reached a parlous state in some Nigerian towns. As Ogunbodede and Olurankinse (2006) noted, the Central Business District (CBD) of all the capital towns in Nigeria lack adequate parking facilities. The CBD has a higher tendency to attract vehicles more than any other land use type in the urban areas, hence inadequate parking

*Okoko, E. is a Professor while Iji, S. O. is a Lecturer in the Department of Urban and Regional Planning, Federal University of Technology, Akure, Nigeria. Solomon-Ayeh B. is a Lecturer at Building and Road Research Institute, Kumasi, Ghana. *Email: entropy411@gmail.com.

spaces in the CBD is a sine qua non for chaos in the transport system. Okoko (2006) noted that there is usually 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 and Salau (2013) attributed parking problems to the absence of clearly designated areas for parking in most Nigerian cities. The absence of clearly designated parks has ineluctably given rise to the emergence of illegal parking lots and unauthorized roadside (on-street) parking in Nigerian cities. This has resulted to such negativities as traffic congestion, distension of travel time and increase in the cost of travelling. Generally, parking is of two types, videlicet, on-street and off-street parking. On-street parking is normally carried out along the side or edge of the road. In this case, maneuvering into and out of a parking space may interfere with traffic flow. This type of parking is often discouraged in congested areas, sharp bends and other areas that may constitute hazards to other road users (Dukiya et al, 2014). Off-street parking is a situation where the parking facility does not directly interfere with the through-traffic flow along a road other than at the access point between the road and the car park.

This research on parking situation in Ore is aimed at deciphering the location, level of usage and adequacy of existing parking facilities in the town. It also aims at collecting and analyzing requisite information on the capacity and existing parking facilities in Ore town. The peculiarity of the parking imbroglio in Ore is due to its status as a nodal or transit town and also as an emerging commercial hub in Ondo state, Nigeria.

The Iconism of Vehicular Parking

Parking analysis is an invaluable facet of urban transportation planning. According to Globalsecurity.org (2015), there are three types of parking studies, namely, parking inventories, parking usage and parking facility studies. Bhatti (2014) expanded the scope of parking studies to include: accumulation counts, duration and turnover surveys as well as user information surveys.

Parking inventory is concerned with the physical count of existing on-street and off-street parking spaces. It assists in determining the capacity of parking facilities as well as their geographical spread (globalsecurity.org, 2015). As Bhatti (2014) observed, parking inventory involves the collection of information on such issues as: the location, condition, type and number of

parking spaces: hours of availability, layout of spaces, ownership of the off-street parking facilities etc. The efficiency of parking facilities in cities depends on the efficacy of such concepts as parking accumulation and parking load. Parking accumulation defines the number of vehicles parked at a given instant of time and is normally expressed as a curve. The curve is obtained by plotting the number of bays occupied against time on a coordinate axis. Parking load on the other hand is the area under the accumulation curve, i. e. the product of the number of vehicles occupying a given parking area and the parking time interval. Data for the computation of parking accumulation and parking load are usually gotten via parking usage survey.

Parking is normally an integral component of the transport system and it plays a crucial role in the management of traffic and congestion (Allison, 2002). Rodrique (2011) noted that in a motorized city, on an average, 30% of the surface is devoted to roads while another 20% is required for off-street parking. Interest in parking research is predicated on the realization that poorly regulated parking normally results in road users paying a higher cost in terms of travel time and efficiency.

Vehicular parking problem has been identified as one of the major transportation problems in Nigerian cities (Asiyanbola and Akinpelu, 2012; Osoba, 2012). It has also been established that parking imbroglio is the major cause of road traffic congestion and accidents (Okoko, 2006; Dukiya et al, 2014). The research reported in this paper is a contribution to knowledge in the area of parking studies. It involved an extensive collection of data from a survey of on-street parking points in Ore town. The study provides information on such parking indices as parking volume, parking accumulation and parking load.

The Setting and the Methods

The research was conducted in Ore town, the headquarters of Odigbo Local Government Area in Ondo State, Nigeria. Ore town has a land area of 1,818km^2 and is located between latitude $6^0 76^1$N and $6^0 45^1$N and longitude $4^0 52^1$E and $5^0 10^1$E. Ore is a nodal and transit town located at the junction of Benin-Shagamu express way, Ore-Okitipupa road and Ore-Ondo road. This makes the town a commercial and strategic settlement not only in Ondo State but also in Nigeria. It also serves as a major gateway to Irele, Ese-Odo, Okitipupa and Ilaje Local Government Areas in Ondo State.

The population of Ore town in 2006 was 31,358 (National Population Commission (NPC), (2006). The dominant occupations of the people in the study area are commercial and farming activities. Intra-urban mobility in the town is mostly by means of private cars, commercial motorcycles, and commercial buses. There is also a high volume of inter-urban traffic generated by an assortment of vehicles that cross the town on a quotidian basis. Other observable transportation features include the proliferation of unauthorized parking areas, illegal loading points and indiscriminate on-street parking along the major roads in the town. Traffic congestion and accidents are the inevitable concomitants to this scenario and they all constitute worrisome features of the transport system in Ore town. The research design for this study was based on the social survey technique and the research was executed at three phases namely, the pre-survey, survey and post-survey phases. The pre-survey phase involved a thorough reconnaissance and delineation of the study area. At this stage, six (6) major roads at the CBD were identified and selected for study. The roads are: (i). the Benin-Shagamu express way; (ii). Broad street; (iii). Ore-Ondo road; (iv). Ore-Okitipupa road; (v). Old Lagos-Benin road and (vi). Sabo market road (Figure 1). The study area was consequently divided into six traffic analysis zones in consonance with the six major roads.

Figure 1.0: Road map of Ore (Source: Google Earth, 2018).

The survey phase involved the collection of all relevant data on the attributes of the major roads, the spatial distribution of on-street parking facilities, the socio-economic characteristics of the motorists, the parking intensity as well as the parking volumetric survey. Basically, this study adopted the questionnaire technique, field observation methods and oral interview as the research tools. The target population was made up of motorists involved in on-street parking in Ore e. g. drivers and owners of private cars, taxis, commercial buses, articulated vehicles and lorries. The sample size of 315 was derived from the sample frame for this study. It represents 50% of the sample frame. The sample frame was gotten from a preliminary volumetric survey conducted at the selected on-street parking spaces in the study area (Table 1).

Table 1: The Sample Frame and the Sample Size

S. No	On-street parking spaces	Zone/location	Category of road	Population of motorists	Sample size (50%)
1	Lagos motor park	Benin-shagamu	Arterial road express way	104	52
2	Benin motor park	Benin-shagamu	Arterial road express way	70	35
3	NNPC-Broad Street	Broad street	distributor	110	55
4	Mobil junction	Broad street	distributor	96	48
5	First bank area	Sabo market	distributor road	80	40
6	Zenith bank	Ore-okitipupa	Arterial road	86	43
7	Akure motor park	Ore-ondo road	arterial	84	42
	Total			630	315

Source: Field survey, 2018.

(a) **Geometric Features of Ore Roads:** The design and geometric attributes of the six sampled roads in Ore town warranted the practice of on-street parking. This is so because all the sampled roads were found to be narrow and they all lacked basic design features such as lay bay for on-street parking. The sampled roads are located in the CBD where there is a high concentration of businesses and trading activities. This necessitated heavy vehicular traffic flow and a concomitant demand for parking facilities.

The six major roads were used for on-street parking by the sampled

motorists and this led to the emergence of parking menace in the town. The major geometric attributes of the sampled roads are presented in Table 2. Three out of the six selected roads namely: Benin-Shagamu expressway, Ore-Ondo road and Ore-Okitipupa road were under the arterial road category. The remaining three i. e. Broad street, Old Lagos-Benin and Sabo Market road were distributor roads. As depicted in Table 2.0, out of the sampled roads, only the Benin-Shagamu express road was a dual carriage way. The remaining ones were single carriage ways. 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 way that had one-way traffic. The right of way of Benin-Shagamu express was 90 metres while Ore-Ondo, Ore-Okitipupa road and Broad street were 45-50 metres. The remaining two roads, that is, old Lagos road and Sabo market road had right of way of 18-25 metres. 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 also reduced the 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 2.0, only one of the roads, that is, the Benin-Shagamu express way was in very good structural condition. This was as a result of the fact that the road had recently been 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 2.0, it is self-evident that all the roads that were examined had their provisional shoulders encroached. It was observed that road side traders and business owners erected temporary or permanent structures on them. For instance, along old Lagos-Benin road, the road shoulders were occupied by traders and street hawkers for the sale of their commodities. The prostitution of the road space for commercial purposes had grievous implication on the parking situation in the study area by way of parking supply deficit. This is so because the road shoulders could have been used for off-street parking if they had not been encroached upon by commercial services.

Furthermore, the table shows that there was no parking regulatory signpost along the sampled roads. Conventionally, traffic and parking are regulated through the use of various regulatory signposts put on specific sections of the road way. From field observation, it was discovered that none of the roads in the study area was provided with any of the regulatory road signs. Furthermore, none of the roads used for on-street parking was demarcated as parking lots to regulate parking on the road surface. This situation further aggravated the deplorable parking condition in Ore town. The poor parking situation in the study area was symptomatic of the lackadaisical attitude of the relevant government agencies in the town to parking management.

The study further revealed that both sides of the sampled roads were used for illegal on-street parking. Furthermore, four out of the seven parking areas were sited adjacent to road intersections. This posed serious challenges for smooth intra urban travel around those locations. The four parking areas located at road intersections created serious traffic problems in the study area during peak traffic periods. Furthermore, parking signs were not available in all the on-street parking spaces along the sampled roads and this situation promoted the proliferation of on-street parking in the study area.

(b) Parking Volumetric Analysis

The study also analyzed the parking volume in the study area to determine the extent of usage of the selected on-street parking spaces. The first level of the analysis was to determine the *daily average vehicular parking volume* of the selected on-street parking spaces in Ore. The study revealed that a total of 611 vehicles parked daily in all the sampled on-street parking spaces. As shown in Figure 2.0, parking was high in all the parking spaces but the peak volume occurred at Lagos motor park (16.69%) and Broad street parking area (16.53%). This shows that the two parking spaces had the largest volume of vehicles parked along the streets in the study area. This high volume is attributable to the high concentration of commercial activities along the affected roads in the study area. The least parking volume (11.28%) occurred at Benin motor park area. Commercial activities were at low concentration in this area and there was a reduction in parking volume. Consequently, parking problems were at a minimum in this location.

Table 2.0: Geometric attributes 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	Shoulder	TS
1	Shagamu-Benin Exp.	Arterial	Dual	3.7	4	1	90	Asphalt	V. Good	4	Nil	Nil	Nil
2	Ore-Ondo Road	Arterial	Single	3.7	2	2	45-50	Asphalt	Fair	3	Nil	Partly	Nil
3	Broad Street	Distributor	Single	3.7	2	2	45-50	Asphalt	Fair	4	Nil	Nil	Nil
4	Ore-Okitipupa Road	Arterial	Single	3.7	2	2	45-50	Asphalt	Fair	4	Nil	Nil	Nil
5	Old Lagos-Benin Road	Distributor	Single	3.7	2	2	18-25	Asphalt	Bad	4	Nil	Nil	Nil
6	Sabo Market Road	Distributor	Single	3.7	2	2	18-25	Asphalt	Fair	3	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, TS=Traffic Signs.
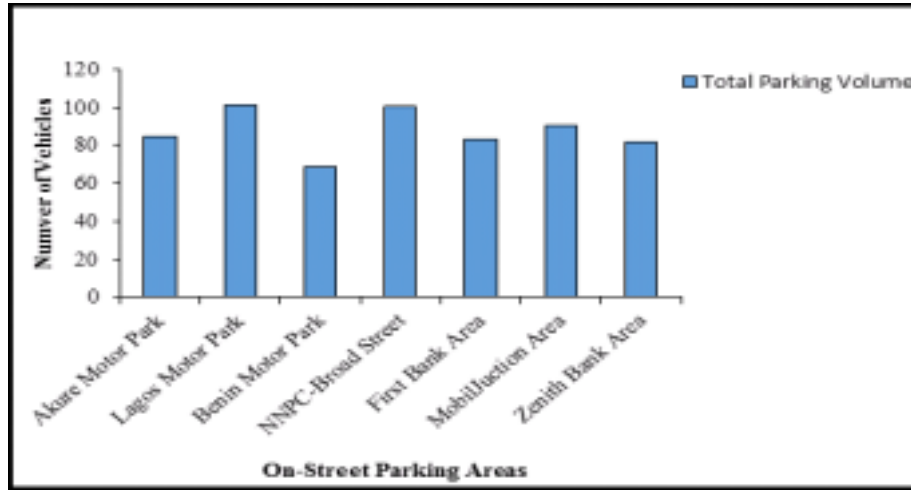
Source: Authors Fieldwork (2018).

Figure 2.0: Parking volume of selected on-street parking spaces in Ore.
Source: Author's Fieldwork (2018).

A chi-squared (X^2) analysis was conducted to determine whether the observed differences in the distribution of the parking volumes at the various parks were actually significant or not. The result of the X^2 analysis in Table 3.0 showed that the calculated value of 9.21 is less than the tabulated value of 12.59 with d.f. = 6 and P=0.05. This implies that there was no significant difference in the parking volume in the selected off-street parking areas. Consequently, parking related menace such as traffic congestion and accidents were likely to be of the same magnitude in all the selected parks in the study area.

Table 3: Chi-squared analysis of parking volume in Ore

S/N	Parking Area	Total Parking Volume	e	o-e	$(o-e)^2$	$(o-e)^2/e$
1	Akure Motor Park	85	87.29	-2.29	5.22	0.06
2	Lagos Motor Park	102	87.29	14.71	216.51	2.48
3	Benin Motor Park	69	87.29	-18.29	334.37	3.83
4	NNPC-Broad Street	101	87.29	13.71	188.08	2.15
5	First Bank Area	83	87.29	-4.29	18.37	0.21
6	Mobil Juction Area	91	87.29	3.71	13.80	0.16
7	Zenith Bank Area	82	87.29	-5.29	27.94	0.32
	Total	611		9.21		

Source: Authors' Fieldwork (2018).

The study also did a modal survey of the vehicles at the various parks in Ore town. It was revealed that 53.00% of the vehicles were cars and buses; 10.00% was made up of articulated vehicles and lorries and lastly 37.00% were motorcycles and tricycles. It is therefore deducible that cars and buses were the dominant types of vehicles parked in the sampled on-street parking areas in Ore. The study also analyzed the on-street parking volume of vehicles on a quotidian basis in the study area. The selected days of the week were Monday, Wednesday, Friday and Saturday. The essence of this was to determine the variation in parking volume vis-a-vis the selected days of the week. The study revealed that there were only slight variations in the parking volume among the days of the week. This was confirmed using a chi-squared test (X^2) where the X^2 value of 3.62 was less than the table value of 7.82 (d.f.=3, P=0.05.) which indicated that there was no significant difference in the parking volume in the selected days of the week. The reason for this is attributable to the high level of commercial activities along the streets where on-street parking was observed. The implication of this is that parking related problems such as traffic congestion and accidents were almost of the same magnitude in all the days of the week in the study area. However, the raw data revealed that parking volume was slightly higher on Friday and Saturday than on Monday and Wednesday due to increased rate of commercial activities during the weekend (Figure 3). The distribution of parking volume in the days under review is shown in Figure 4.
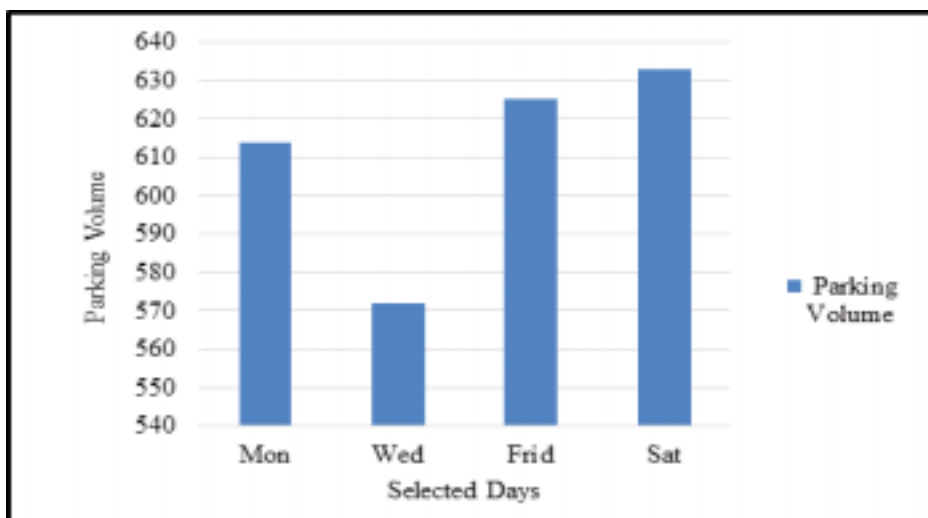

Figure 3.0. Parking volume of selected days of the week in Ore.
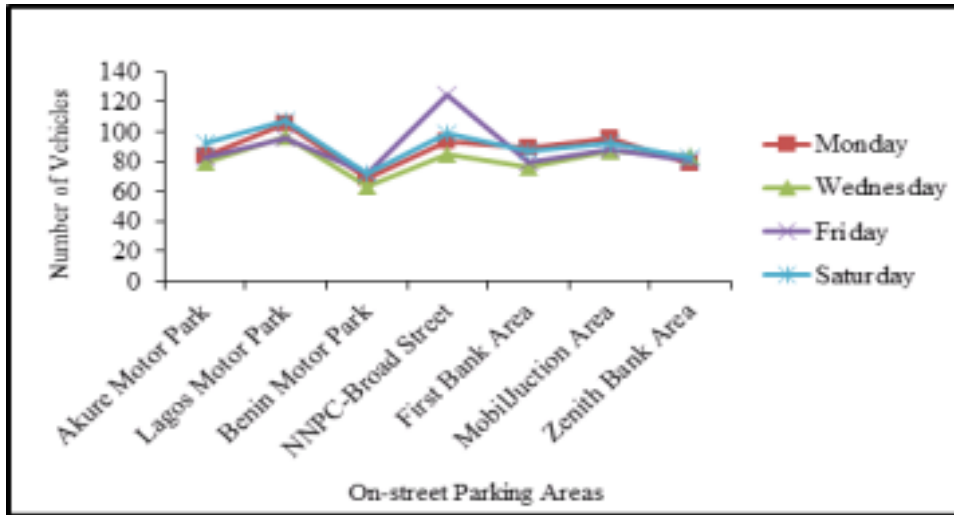*Source:* Authors' Fieldwork (2018).

Figure 4. Parking volume of selected days of the week and Parking Areas in Ore.
Source: Authors' Fieldwork (2018).

Daily parking accumulation analysis was also done for each of the selected on-street parking areas in Ore. The parking accumulation survey was carried out at 7 selected parking areas, namely Akure motor park, Lagos motor park, Benin motor park, Broad street, First Bank area, Mobil junction area and Zenith Bank area. The study revealed that parking accumulation ranged from 12 – 45 vehicles per time interval of 30minutes. This means that the parking areas were intensively used throughout the day (see Figure 5.0). The figure shows that parking accumulation peaked in almost all the parking areas at two distinct periods. The first peak period was 10.30am – 11.ooam in the morning and the second peak period was between 15.30pm – 16.00pm in the afternoon. This implies that parking problem was generally at its peak between 10.00 – 11.ooam in the morning and between 15.00 – 16.00pm in the afternoon in Ore.

Parking Load Analysis was also carried out on the data collected. Parking load is expressed as vehicle-minutes or vehicle-hour. This is computed by multiplying the number of vehicles occupying a given parking area with parking time interval. It gives the area under the parking accumulation of each sampled parking area. Figure 6.0 is a bar graph showing the daily average parking load of the sampled parking areas with an average of 318 vehicle hour. This means that the sampled parking areas were intensively used. Lagos motor park area with 18% had the largest parking load. This implies that it

was the most intensively used park by motorists in the study area. It also means that parking problem was at its peak in this area. On the other hand, Benin motor park area with 10.00% had the least parking load. This also implied that this parking area had the lowest usage and parking related problems were at the minimum level in this location.
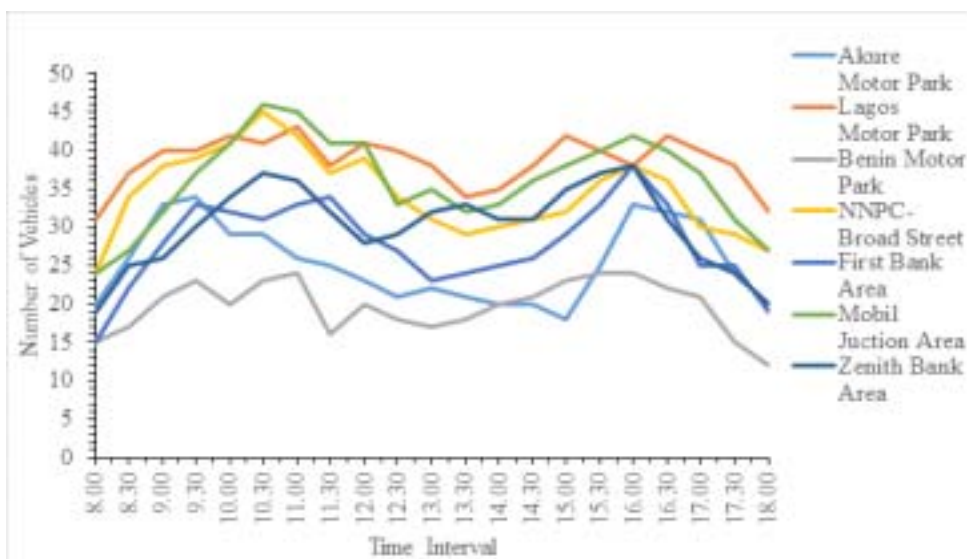

Figure 5. Parking accumulation at the selected on-street parking areas in Ore
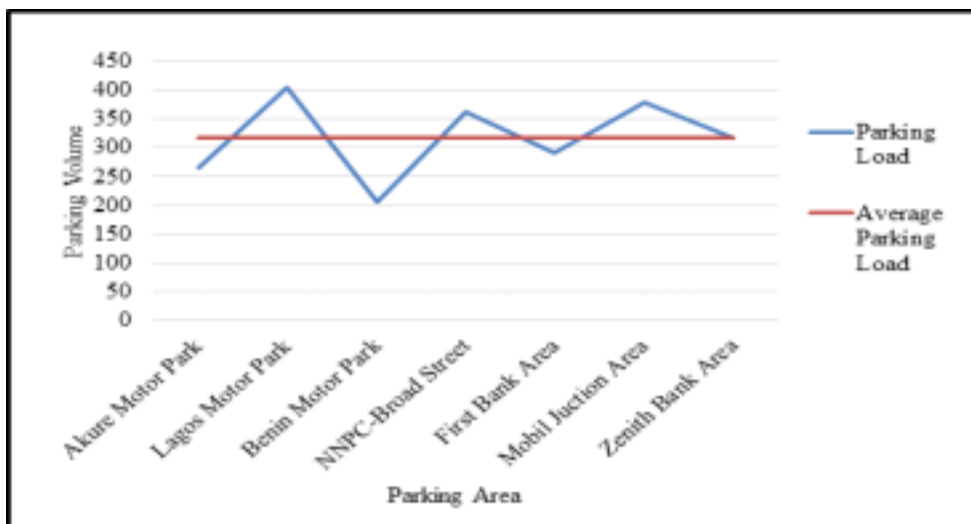Source: Authors' Fieldwork (2018)

Figure 6: Parking load of on-street parking areas in Ore.
Source: Fieldwork (2018).

(c)   The Causalities

The study also identified some causal factors and their effects on on-street parking in Ore. According to the opinion of the sampled motorists, the absence of off-street parking space was the primal reason for on-street parking in Ore. The town does not have off-street parking facilities along its major roads. Other reasons adduced by the sampled motorists for on-street parking in Ore include poor transport planning in the town and poor parking management by the relevant agencies. The invidious effects of converting portions of the road to points of embarkation and disembarkation were also identified by the sampled motorists. These are: traffic congestion on the affected roads; traffic accidents and; long journey time. All these problems hindered smooth intra- and inter – township mobility in Ore town.

The study also noted that motorists resorted to on-street parking because of inefficient parking management in the town. This observation calls for pragmatic and concerted efforts by the relevant planning authorities to effectuate the enforcement of parking management ordinances in Ore town. The study also identified the need for the provision of off-street parking facilities as a major step towards addressing the on-street parking menace in the study area. The study also identified the enforcement of parking control measures; implementation of development control measures; introduction of public enlightenment programmes for the motorists and the proper demarcation of specified sections of the road for on-street parking as salutary panacea to the parking imbroglio in Ore town.

Ultimately, the research revealed that major roads in Ore town were in deplorable structural and geometric condition at the time of the study. The study further revealed that the shoulders of all the major roads sampled for the research had been converted to parking lots by motorists and that, there were no regulatory signs to prevent indiscriminate on-street parking of vehicles by motorists in Ore. The totality of all this led to the proliferation of illegal on-street motor parks and loading points along the sampled roads in the study area.

The Summing Up

Consequent upon the findings discussed above, this study calls for effective parking control and management in the study area. Parking regulatory signs should be provided at designated sections along the major roads in the study

area. Relevant traffic control agencies should be empowered and equipped to enforce the extant parking control measures. Appropriate penalty should be inflicted on defaulters to serve as deterrent to other would-be offenders. Public enlightenment campaigns on both the print and electronic media should be conducted for motorists particularly commercial vehicle operators in ore town. There is also the need for the Physical Planning Authorities in Ore, especially the Local Planning Authority, to enforce the minimum building setback and ensure that the road formation width regulation is effectively enforced. This will provide considerable space for off-street parking development and attenuate the number of vehicles parked by the road side in the study area. The study also makes a strong advocacy for the establishment of properly designated off-street parking facilities in Ore town. Such off-street parks should be properly managed by trained staff and such issues as parking fees and security should be adequately addressed.

This study recommends the provision of off-street trailer park along the express way in Ore, to mitigate the number of heavy vehicles parked illegally on the roadside. The trailer parks should have ample parking space, security, restaurants and other adscititious services. Controlled and regulated On-street parking facilities are, however, recommended for such roads as Broad Street and Ore-Okitipupa road where parking accumulation is heavy. The specific sections of the road to be used for on-street parking should be properly demarcated with clearly visible and fluorescent paints. This will discourage the existing practice of illegal conversion of road space to unauthorized on-street parking lots.

In peroration, it is an incontrovertible veracity that the prevailing parking condition in Ore town hinders smooth inter– and intra–urban mobility especially within the core area of the town. Consequently, it is imperative to halt this ugly oddity as quickly as possible in order to ensure seamless urban mobility in Ore town.

REFERENCES

Aderamo, A. J. and 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.

Allison, L. C. (2002). Dynamics of On-street Parking in Lagos Central Cities. Rudin Centre for Transportation Policy and Management, NYU Robert F.

Wagner Graduate School of Public Service. 4 Washington Square North New York. NY 10003.

Asiyanbola, R. A. and Akinpelu, A. A. (2012). The Challenges of On-street Parking in Nigerian Cities and Transportation Routes, International Journal of Development and Sustainability. 1 (2). Pp. 476 – 489.

Bhatti, M. B. (2014). Parking Studies for Provision of Parking Lots (an online book on parking studies) retrieved from http://www.linkdin.com/pulse/parking-studies-provision-lots-   bhatti. 2015.

Dukiya, J. J.; Zubairu, S. N. and Ayuba, P. (2014). The Problems of Articulated Vehicles On-road Parking at Mokwa and Tegina in Niger State, Nigeria.

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

Ogunbodede, E. F. and Olurankinse, F. (2006). Reducing Mobility Barriers for Sustainable Intra-urban Transport Development in Nigerian Cities. Journal of Geography and Planning Sciences. 2(1), pp. 40 – 50.

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

Okoko, E. (2018). Spatial Interaction: the Quintessence of Urban Mobility. Inaugural Lecture Series 98, Federal University of Technology, Akure, Nigeria.

Osoba, S. B. (2012). Appraisal of Parking Problems and Traffic Management Measures in Central Business Districts in Lagos, Nigeria. Journal of Sustainable Development, 5(8), pp. 105 – 115.

Rodrigue, J. P. (2011). Transportation and Urban Form. Geography of Transport System. An online textbook authored by jean-paul rodrique. Department of Economics and Geography Hofstra University. Accessed from: http://www.people.hofstra.edu/geotrans/eng/ch6en/ch6menu.html (2011).

Tom, V. M. (2014) Lecture notes on traffic engineering and management. Retrieved from: http://www.civil.iitb.ac.in/tvm/1111-nptel/581_parking/plain/plain.html