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Effect of Land Use on Traffic Generation

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Abstracts

Urban land use management in Enugu metropolis does not appear in line with any of the earlier known and tested patterns. In fact, it appears to have more of "development and in corporation pattern".

The resultant traffic circulation situation appears problematic, especially during peak period due to poor urban land use management.

This work aims at examining those problems with a view to preferring both short and long term solutions.

Keywords: Traffic Generation.

Introduction

Enugu, dynamic and rapidly growing metropolis is the capital of Enugu state. It started as a town and later became the headquarters of the former eastern Nigeria in 1954 and capital of former east central and defunct Anambra state.

It became the capital of Enugu state in 1992. This notwithstanding the impact of its former status is still being felt today. Its land is diversified and can be grouped into the following: Mining, commercial, industrial, residential, administrative, educational, recreational and transportation.

The city is observed with roads, rail lines and airport. Its degree of urbanization is closely connected with the aforementioned transport facilities. Transportation has been identified to be vital to the urbanization of Enugu metropolis at two district levels.

Firstly, the inter-region, inter-state and inter-city transport facilities like trunk roads, rail way line and airport formed the strongly base for the building of Enugu metropolis.

Before the introduction of long distance transportation, Enugu community depended upon its surrounding area for food and materials. The introduction of rail lines helped in the movement of the local and raw materials for export, while the trunk roads and airports increased movement of people and goods in and out of Enugu metropolis.

The resultant increase in mining, commercial and administrative activities of the town did not only improve on its economic base but also brought about the physical growth of the town.

Secondly, the intra-city transport within Enugu metropolis plays a strategic role in linking the various urban activities because it gives a much closer network and flexibility than the rail line, trunk roads and the airport, it increases as the size and complexity of the town grows.

Background of the study

Enugu, a dynamic and rapidly growing metropolis is the capital of Enugu state. It started as mining town and later became the headquarters of the former eastern Nigeria region in 1954 and capital of former east central and defunct Anambra state. This notwithstanding the impact of its former status is still being felt today. Its land is diversified and can be grouped into following: mining, commercial, industrial, residential, administrative, education, recreational and transportation. The city is serviced with roads, rail lines and airport. Its degree of urbanization is closely connected with the aforementioned transport facilities.

Transportation has been identified to be vital to the urbanization of Enugu metropolis at two district levels.

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Statement of problem

Communication through transportation is one of the important features in an urban area. It is not therefore wrong to say that urban traffic sustains urban activities.

One major of the issues pertaining to urban traffic in Nigeria is the way it has been affected by the present economic depression, the fall in environment quality of

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our roads, higher running cost of vehicles and the general attitudes of commercial vehicle drivers. In the recent times, cost of movement however, generally been on the increase within Enugu metropolis with its resultant negative effect on the economy of the Enugu town hence this subject is brought into focus.

Aimes/Objectives of study

Urban centers generate traffic, which in turn sustains urbanization. Frequent movement of people, goods and materials is important for the economic growth of an urban settlement. Any situation which affects traffics in an urban area also affects its economy. This paper therefore intends to critically look into the urban traffic system in Enugu metropolis, its merits and demerits, recommend ways it can be improved upon.

Significance of study

In the recent past, migration into Trans-ekulu, Enugu metropolis has been on the increase. The city has been attractive to people of Enugu state and people from other state of the former eastern Nigeria. It also harbor most federal/state establishment such as university of Nigeria Enugu campus, university of Nigeria teaching Hospital, the Enugu State university of science and technology, Enugu state teaching hospital, park lane, the institute of management and technology(IMT), federal ministry of works, project development agency (PRODA), the 82 division, custom and immigration services to mention but a few. The increase in population due to the migration and the establishment of both federal and state establishments, compounds the traffic problem identified in Enugu metropolis. In addition to this, hilly nature of the topography of Enugu town and the expensive nature of urban redevelopment to make way for effective traffic system made it necessary to carryout this study. The findings and recommendations in this study will not only assist to ensure effective traffic system as the city grows but also help in the economic growth of the town if implemented.

Limitation of study

It has been said earlier that Trans-ekulu, Enugu metropolis is serviced with network of roads, rail lines and airport. This study will be limited to road traffic on the Enugu Township.

The study however will not be in isolation because Enugu Township roads have link with the trunk roads and rail lines which transverse Enugu town and also with the airports.

Review of literature

Transportation and urban traffic

Transportation consideration is a factor that significantly affects the economics ability of an area to compete with other areas in the production of goods and services. Businessmen are always concerned about the distance from which they must ship their finished products. Local producers often benefit from their ability to move products to market at lower cost, in less time and in fresher condition than their outlying competitors. Savings in transportation cost can make it possible for local producers to compete favorably with producers who live in areas that boost strong natural advantages for producing a particular product. Local operators, for example, often supply consumer with manufactured goods, farm products or recreation opportunities of lower prices than could be secured from prime production points in other parts of the country.

Changes in the transportation cost situation have provided a major boost for the economic development of many areas during the past two centuries. As late as 1816, the market price of flour in the United States did not justify its transportation for distance of over 150 miles over land and bulky and heavy articles could be shipped 3,000lmiles across the Atlantic Ocean at the same cost 30 miles overland. The cost of shipping wheat from Buffalo to New York City was approximately 100 per ton in 1817 or roughly three times its delivered value in New York City. With the opening of the Erie Canal in 1925, this shipping cost dropped to 8.81 a ton and it suddenly became economically feasible for farmers in western New York and along the great lakes to ship their excess products to eastern market.

As late as the middle of 1800s, limited road transportation facilities a high transportation costs favored concentrations of land settlements along navigable streams.

Distant over land transportation was limited primarily to objects with high value to weight rations and cities were usually dependent upon their immediate hinter land areas for much of their food as well as other products with low value to weight rations. The building of canals, rail lines, roads, high ways, airports and pipelines and the introduction of new and improved modes of transportation since 1850 have provided most areas with a wide variety of transportation opportunities while at the same time, reducing transportation costs, time, and perish ability hazards. This development have greatly relaxed the transportation constraints of the past and have made it possible for producers to consider far-off

places both as potential services of raw materials and as market areas.

Road transport therefore is an integral part of facet of our everyday life. Transportation has been a necessary concomitant of the exchange economy. The economy organization of cities is based on specialization and exchange. It is the transportation of goods and services in an exchange economy that generated traffic. The traffic in towns reported by Sir. S. C. D. Bukana, 1963, clearly demonstrated that the movement of goods and people by both public transport and private motor vehicles is linked with the distribution and intensity of land use. The report further said "vehicles do not move about the roads for mysterious reasons of their own". They move only because people wants them to move in connection with the activities which they are in.

Traffic therefore is a function of activities and traffic is concentrated in towns of activities are concentrated there.

These activities mainly take place in building or flaws such as markets, depots, docks and stations. In urban confers therefore, traffic can be said to be function of built up area. It can also be added that traffic is related to population and economic activity and special distribution of economic activity or land use.

Summary of reviewed literature TRAFFIC FACILITIES

A study which sets out look at the long term development of roads traffic in urban areas should lead to a study of urban areas as a whole. In the study of the use of urban areas, buchman in his report on traffic in towns highlighted the present problem involved in the use of urban areas and indicated some of the possible solutions which include the use of access space. The use of access space for example, roads, streets and parking spaces in urban areas is a function of the activities which take place in those areas.

Roads in this context relates to routes which are primarily used for carrying traffic while streets relate to those which are developed with adjoin buildings and are primarily used for giving access to these buildings.

For development plan purposes roads and streets are grouped into trunk roads, other principal traffic roads, main and minor streets according to their functions. The trunk forms the principal routes for through traffic in the country. The other principal traffic roads connect large centers of population and other roads of outstanding

importance for through traffic. Main and minor streets are localized in cities and are purely local importance.

Local framework in providing traffic facilities

Roads, streets and parking spaces are non-profit earning facilities required by modern society and provided by the government. Because they cannot compete with profit making for landed properties, the government ensures in one way or the other that land is available for their purpose. As a result there is a complicated legal framework rooted in the power of eminent domain of the government.

Traffic planning

In studying an urban area of traffic planning purposes, the present day trip generation rate are established for different land use, for population and economic characteristics. Traffic planning is based on the present projected into the future. The amount of traffic generated by these economic activities of present is projected to anticipate the amount of traffic in future. This is influenced by the following factors:

(a) The land use factors

Different land use produces different trip generation characteristics. For example, land devoted to shopping and offices are expected to generate more traffic than open spaces. Similarly the intensity with which different activities are pursed can produce different trip generation characteristics.

For example, a hectare of land developed into high residential density will be likely to be produce more pedestrian traffic than the equal hectare of land developed into low residential area occupied by fewer and probably more expensive dwellings could as well produce more private more vehicles trips than the density residential areas. Commercial and industrial land uses and other employment centers are the next most significant land uses that generate traffic. Educational and cultural areas are also not left in generation of traffic.

(b) House-hold size

There is a relationship between the number and frequency of trips made from the home and size of house hold.

Average trip frequency of rate of approximately 8 trips per day for each additional person . The greater the size of household the more the trips that is generated. This increases however in number trips with household size is related to non-work trips.

(c) Motor vehicle ownership

The ability to satisfy your travel demand is affected by the availability of alternative means of

transport and the adequacy of high way system. The number of vehicles available for use by each household has been found to have a significant influence on traffic generation. Household with more than one vehicle tend to generate more trips than household with more one vehicle. Single car household may utilize their vehicle more intensively but more trips are generated in respect of multiple car house holds.

(d) Family income

The ability to pay for journey affects the number of traffic generated by a household increasing family income therefore give rise to greater trip generation.

(e) The structure of the population

This is based on the fact that different age group produces different movement demand and characteristics. For example, the youthful population (15-25 years) is expected to produce more journeys of social and recreational natures than older age group.

(f) Socio-economic characteristics of population

This will be expected to produce different demands, for example, artisan workers will be expected to produce quite different movement characteristics than white collar workers.

Traffic control devices and systems

In order to provide safe and efficient traffic, uniform standards have been developed for the use of all public street and high facilities.

Traffic control devices which is universally used in most part of the world include all signs markings and signal placed in adjacent to a street or highway by public agencies in order to regulate, warn or guide traffic. For traffic control devices to be effective, they should;

- (a) Fulfill a need
- (b) Command attention
- (c) Convey a clear simple meaning
- (d) Command respect of drivers and pedestrians
- (e) Be placed so as to give users time for proper response.

Traffic control devices should be reasonable and appropriate for the traffic requirements of the location used. It is important that devices be maintained to high standards to insure that legibility and visibility are maintained.

Traffic signs

There are three functional classes of traffic signs;

- 1. Regulatory
- 2. Warning and
- Guide signs

Examples of these classes are in figure 1

Regulatory signs give users notice of traffic laws and regulations such as stop, speed limit; 50km/p,

one way, no parking, cross only and regulate traffic in various other ways.

Warning signs direct the user attention to conditions on or adjacent to a street or high way that are potentially hazardous to traffic operations such signs require the motorist to exercise caution, reduce speed or make man curve in the interest of his own safety or that of other motorist or pedestrian.

Examples of warning signs are curve signs showing curved arrow, stop ahead or pavement ends signs, guide signs indicate route designations, directions, distances, point of interest and other geographical or cultural information.

Traffic marking

Markings consist of point or some other materials placed on the pavement, curb or object to convey traffic regulations and warnings to drivers. Marking may be used alone or in combination with traffic signs or signals.

There are five general classes of markings:

- 1. Pavement marking
- 2. Curb marking
- 3. Object marking
- 4. Delineators and

5. Colored pavements

The most common type of marking is pavement markings example of which is shown in fig. 2:

- (a) Typical pavement marking with offset lane lines continued through the intersection and options cross walk line and shop limit lines
- **(b)** Typical pavement marking with optional double turn lane lines pavement messages, cross walk and stop limit lines
- (c) Typical pavement with optional turn lane lines cross walk lines

Traffic signals

The most common type of signals is traffic control signals. It is primarily used to control the movements of vehicle and pedestrian traffic of intersections. Traffic signals are mostly needed where following occurs:

- 1. Where traffic volumes intersecting streets exceeds values envisaged during planning
- 2. Where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or hazard in entering or crossing the major street

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- 3. Where vehicular or a major street and pedestrian volumes crossing that street exceed specified levels
- 4. Where inadequate gaps exist for school children to cross of established school crossing
- 5. Where it is necessary to maintain proper grouping or platoning of vehicles and effectively regulate group speed
- Where the number of reported accidents 6. exceeds a specified number
- 7. At a common intersection of two or more major routed within a traffic flow system

Traffic signals are separated by electromechanical or electronic controllers. In some cases, traffic wardens are used to control traffic when the above situations occur.

Cost and benefit of efficient traffic system

An efficient traffic system helps to improve the exchange economy. Its provision cost intensive hence it is necessary to compare its cost with its benefit when a traffic scheme is to embark upon.

Benefits derived from an efficient traffic system are both tangible and intangible. Tangible benefit such as savings in cost to the community of road accidents, losses and gains in vehicles operating costs derived from building fast traffic routers and savings user of vehicles through relieving congestion can be measured in money forms and therefore can be compared with cost of developing or improving on a traffic system. Intangible benefits such as reduction in pollution and noise, having more time for leisure and less nervous strain from urban life cannot be measured financially but are also very important consideration in planning traffic system in

Saving in cost to the community of road accident

Traffic accidents result in loss, in having injure persons kept from work and others looking after them, in killing people who have a contribution to make the community, in destroying assets and in the misery suffering of the victims and their dependants. It is possible to measure in money terms all the losses except the last. Where it is possible to guess from accidents that would be averted by a particular improvement, it will then be possible to place money value in the prospective

The losses and gains in vehicle operating costs from building fast traffic routes

The cost of operating a vehicle may be divided into running costs which are incurred while the vehicle is on the road and fixed or standing charges which must be paid whether the vehicle is running on the road or not. Running costs depend on the number of kilometers that are covered and vary with the speed and with the amount of stopping and starting that arises from congestion. Fixed charges are spread over time the vehicle is operating independently of its speed.

Vehicle which traveled on the bye pass instead of on the old route would incur heavier running cost due to tear and wear of the engine and other mechanical parts as they would be travelling faster for at uniform speeds running cost are lowest for speeds for about 20mph (32kph) and increases as speeds depart from this. But as against this, they would save the running cost incurred on the old route in stopping and starting. For a particular journey, there fixed charges would be loss since travelling time would be saved. Economics of planned development by Lich Field 1969 page 270.

The savings to users of vehicles by relieving traffic congestion

Time is lost to vehicle users as a result of traffic congestion because the average speed of journey is reduces where a road improvement is aimed at relieving traffic congestion, the average amount of time that would be saved per vehicle can be gauged by comparing the estimated speed of traffic after the improvement with that which takes place before. Persons going to and from work, shops and clubs would save their personnel as opposed to working divine and would have more time for leisure and less nervous strain from urban life. This could both be measured financially, where the savings to vehicle users would result is more time being available for work of any kind connected with economic life or less time spent on the same amount of work, the saving would appear in the decreased cost of production of goods and services to obtain a measure of this saving, it would be necessary to know what number of persons in vehicles currently using the road are engaged in economic processes, what time they would save, how it would be used and what the value of their output in this time would be. This would be impossible without close questioning of drivers and passengers. A partial and rough measure of the loss can be however be obtain by the total number of commercial and public transport vehicles by calculating the time that would be saved by drivers and multiplying by a money value per hour.

The urban traffic was a function of land use by Mitchell and rapkin 1954, made a statement, the statement that paved the way for a new line of thinking in an urban transportation and land use planning.

Their thinking illustrated further that there is a relationship between traffic and buildings. In towns, traffic takes place because of buildings and in fact, all

movements in a town have an origin and destination in a building.

The pattern traced by traffic is thus closely related in manner in which buildings are arranged. Commuter flows are closely dependent upon the location and size of the work place and home areas.

Burgess 1925 suggested a concentric zone development of urban land uses, he base his theory on the idea that similar or functionally related activities will locate at the same distance from the center of an urban area.

Robert Buchanan Mitchell, Chester Rapkin 1954, demonstrated the metropolitan planning for land use and transportation planning for land use and transportation.

Land use and transportation are mutually interconnected, Mitchell and Rapkin 1952.

Urban traffic a function of land use, Robert Buchanan Mitchell, Chester Rapkin Snippet view in 1954.

Robert Buchanan Mitchell, Chester Rapkin snippet view, 1977......3 relating land use to traffic.

Research design and methodolgy

In order to examine what was actually happening in respect of traffic in Enugu metropolis, efforts were made to study traffic situation in Enugu metropolis.

Method of data collection

In this research, two method were used in the collection of data

- 1. Personal observation
- 2. Information from the offices involved in traffic related matters

Personal observation

With my topic EFFECT OF LAND USE ON TRAFFIC GENERATION, it was not possible to gather information through questionnaire. Information was gathered through observation of the traffic on some Enugu township roads more especially on trans-ekulu roads. A survey of volume of traffic were carried out at three locations namely; Abakiliki road (IMT Campus II axis) Zik Avenue (Leventis axis) and Agbani road (Mayor bus stop axis). These locations were chosen because Abakiliki road is the gateway for Abakpa, G.R.A, Ekulu West, trans-ekulu, thinker's corner and Emene Layouts to the central business district, Zik Avenue is the gateway for Uwani, Maryland and part of Achara Layout while Agbani road handles traffic that originates from very high density layout like Achara Layout, Awkunanw and Garki, including traffic from port Harcourt, Aba, Owerri and Okigwe into town. The observation was carried out between 8am and 8pm on a working day. Observation was also carried out on Abakiliki road, Okpara Avenue, Nike road, Chime Avenue, Ogui road, Agbani road, Zik Avenue, Bisalla road and Trans-ekulu road to determine easy flow or impaired flow of traffic and at what time of the day these occur.

Information about areas of frequent accident number of vehicles and license issued and map showing the Enugu planning area and network of road were obtained from the federal road safety commission, enugu motor licensing office and enugu town planning authority respectively.

1. The motor park/major areas in Enugu metropolis in relation to the generation of traffic in Enugu.

The observation and questionnaire was conducted at the major motor parks and bus stops in enugu metropolis to ascertain its effect on traffic generation, they are;

- a. Old park motor park
- b. New market park
- c. Garki motor park
- d. Holy Ghost park
- e. Abakpa main market park
- f. Oye Emene park
- Old park motor area, this location plays role (a) of distribution of people coming camp towards Enugu prisons yard, it also collects and distributes people going to Abakpa, Emene, New Layout and Obiagu, this is one of the major motor park in Enugu metropolis that generates traffic and most of the time causes traffic congestion between Enugu prison's headquarters and Holy Ghost. This period during peak time, due to poor dualization of road networks there, a driver whom we was able to get his attention to us told us that the major problem they have in distributing goods and people here is inadequate road network and no parking lots/space and they ask on the government of Enugu State to do something about it, it also distribute passengers going to Nsukka and so on.
- (b) New market park: this is also one of the major motor parks we have in Enugu metropolis, it collects and distributes passengers form Ngwo to the market and from there to Agu-Abor side and towards ninth mile corner to Udi through Enugu-Onitsha Expressway or through Milk in Hill road Ngwo, this park also collects and distributes passengers going to Oji River, Ezeagu, Agwu and Owerri. This park also collects and distributes people coming and going to old park market, Obiagu and Ogui road, they intersect with road leading to Golf Estate Extension and the Enugu-Onitsha Expressways

- (c) Garki motor park is one of the major motor parks that controls and coordinate traffic coming and going o Agbani, Awkunanaw, Ugbawka, Ugwuaji toward old park road to Holy Ghost park, there is also traffic congestion during the peak period due to heavy traffic it controls.
- (d) Holy Ghost Park is also one of the major parks available in Enugu metropolis which collects people and distributes them in their various destination such as Mgbemena street in Ogbete, Akwa eze, Port Harcourt street and towards Zik Avenue, Garden Avenue, Campus II axis and Trans-ekulu and Agbani road respectively, one of the major problems of this park is its heavy traffic control because of different intersection of roads, such as Okpara Avenue roads, Garden Avenue roads, etc, a driver from Peace bus stop told us that proper dualization of this road need to be carried out by Government of Enugu State to avoid its frequent traffic congestion at the intersection axis.
- (e) Abakpa main market park: collects and distributes traffic and passengers going to Park Lane and Trans-Ekulu axis and also from Abakpa to Nowas junction intersecting with Nike road towards road 7 and 9 respectively, this park also collects and distribute passengers from Nkwo Nike to Abakpa barrack junction (82 Division Headquarters) and towards Emene and Port Harcourt expressways. The major intersections and congestion is at second bus stop and fly over axis, because of heavy traffic circulation from Akpa acha and federal housing estate, Abakpa and Nike Girls secondary school.
- (f) **Oye Emene Park:** collects and distributes passengers from Umuchigbo Community and Eke Obinagu to Abakaliki road, Ogui road and Old Park and to Independence Layout respectively, the driver that allowed us to question him said that the only passengers they carry here is people going to Old Park, Ogui junction, Campus II and Abakpa junction, he said that they experience traffic congestion during the peak period of 9am and 8pm everyday due to heavy traffic between Emenite junction and Port Harcourt Expressway and Enugu-Abakaliki road.
- 2. The major bus stops in Enugu metropolis and its effect to traffic generation.

The major bus stops in Enugu are;

- (1) IMT campus II bus stop
- (2) Ogui junction bus stop
- (3) IMT campus II and I bus stop (school gate)
- (4) Nowas bus stop
- (5) Polo park bus stop
- (6) New haven bus stop
- (7) ESBS bus stop
- (8) Agric bank bus stop and
- (9) Nkpokiti bus stop

- 1. **IMT campus II bus stop:** this is where there is stop over and discharging of passengers stopping and entering another bus. It limits traffic congestion and easy traffic congestion and easy traffic flow, this is mainly people coming from Independence Layout, Agbani road, Abakpa and Emene through Enugu-Abakaliki road, New Haven and so on.
- 2. **Ogui junction bus stop** is mainly for stopping at new berries park, nwodoh GRA, Chime avenue, PDP Secretariat, juhel, fire for fire area and zoo estate.
- 3. **IMT campus III and I bus stop:** this is the stop over of student heading to school main campus in Independence Layout, MSP campus and Rectors village, there is most at times traffic congestion in this avenue and accidents due to inadequate parking space for bus and private vehicles coming and going to the campus and its intersection with Nkpokiti/Agbani road, drivers and students plead on government to do proper traffic planning in this avenue.
- 4. **NOWAS bus stop:** this is where people coming from Nike road and Abakpa through liberty and Akpa acha stops and enter bus going to Old Park or Holy Ghost or people stopping at the Zenith bank or the NOWAS avenue or the Nike road avenue.
- 5. **Polo park bus stop:** it is also loading and stopping of people, stopping at Polo Park/Shoprite avenue, campus II main hostel, and Park Lane and loading of people going to Abakpa or Trans-Ekulu area. It earns accessibility and free flow of vehicles.
- 6. **New haven bus stop:** It drops and collects people going to Orie Emene and drops people stopping at Upper Chime Avenue, NNPC filing station, NIPCO, New Haven market, First Bank, Ebeano Estate and Texaco arena.
- 7. **ESBS bus stop:** collects and stops people stopping at ESBS avenue, Ozubulu street, Lady Ibiam Girls secondary school, Top Rank Hotel and National Library.
- 8. **National library/NTA bus stop:** Drops passengers stopping at National Library, liberty Estate, Phase II and I, National Immigration service office Enugu, Federal Character Commission Office, etc.
- 9. **WAEC bus stop:** plays an important role in normal traffic generation in Enugu, this is the bus stop where most civil servants are dropped, such as ENSUBED office, WAEC office, Federal Ministry of water resources, FADAMA II office, National Industrial Court avenue, UBA bank, Water board.
- 10. **P&T bus stop:** this is also bus stop where people heading to State Civil Service Commission office are stopped, Ministry of Health Office, Okpara Avenue, Firs Bank of Nigeria headquarters, Enugu, ECTPA office and so on.

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- 11. **Agric bank bus stop:** It is a place where passengers stopping at Agric Bank; Providence High School, Coal City University, and INEC office are stopped and loading of passengers going to Garki and Agbani road.
- **12. Nkpokiti bus stop:** It is also a location where passengers heading to Afia Nine, C to C plaza and Asata are stopped.

All these bus stop plays an important role in efficient traffic regulation generation without traffic congestion but most of them contribute to traffic congestion due to wrong parking and indiscriminate parking by drivers. Sometime, punishable measures should be taken to any driver who parks his bus/car wrongly.

Data analysis

Presentation of base data

Traffic generation factors

In this chapter the researcher discusses the factors that generate traffic within Enugu metropolis which gives an insight into pattern and intensity of the movement of persons within Enugu metropolis.

Presentation of data on objective 1 or research question i

Land use pattern of Enugu metropolis

Figure III titled Enugu planning authority area is a map showing the orientation of various layouts in Enugu and the land use pattern of Enugu metropolis. The map shows the central area which consists of Ogbete layout, Asata camp, Chime Avenue, Ogui layout, Ogui Nike layout, Asata layout, Trans-ekulu layout and Okpara avenue area.

Surrounding the central business distinct are the residential layouts

Table 1 shows the names of the layout and their residential densities:

Tuble 1 shows the names of the wyour and their residential densities.					
Names of the residential layouts	Type of residential density				
Idaw river layout	High density residential area				
Achara layout	High density residential area				
New era layout	High density residential area				
Awkunanaw layout	High density residential area				
Uwani layout	High density residential area				
Mary land layout	High density residential area				
Asata river layout	High density residential area				
Independence layout	Low density residential area				
New Haven layout	Medium density residential area				
Oriental Estate layout	Medium density residential area				
Thinkers Corner layout	High density residential area				
Ekulu layout	High density residential area				
G R A layout	High density residential area				
Ekulu West layout	High density residential area				
Trans-Ekulu layout	Low density residential area				
Abakpa Nike layout	Low density residential area				
Iva Valley layout	High density residential area				
Emene layout	High density residential area				

SOURCE: FIELD SURVEY 1999

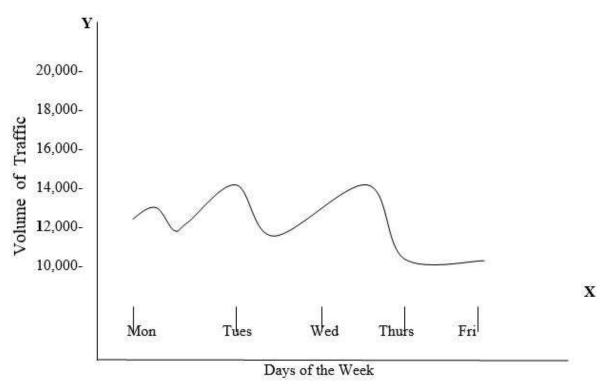
There is an Industrial Estate at Eastern fringe of the metropolis known as Emene Industrial Estate, while mining activities go on at the western fringe of the town-the Iva valley area. It is important to note that some adjoining part of Uwani, Ogui Nike Layout and Independence Layout has a high concentration of educational activities. This area is located at the

University Primary and Secondary School, federal catering and hotel management school, the City Girls Secondary School, the Queens College, the Enugu State University of Science and Technology, Enugu.

This graph shown below shows the volume of traffic and the days of the week

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X = Hours of the day Y = Volume of traffic

Motor vehicle ownership in Enugu town

Presentation of data on objective 2 or research question 2

TABLE II

Number of the vehicles and motorcycles registered in Enugu metropolis from 1994 to Nov.1999.

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Type of vehicle	1994	1995	1996	1997	1998	1999	Total
Private	365	231	218	256	226	208	1504
Commercial	226	212	208	224	212	197	1279
Motorcycle	269	312	270	452	406	35	2084
Total	860	755	696	932	884	780	4897

SOURCE: ENUGU STATE MOTOR REGISTRY ENUGU

Table II shows the numbers of vehicles and motorcycles It is important to note that not all vehicles and registered in Enugu metropolis from 1994 to 1999, a furthermotorcycles registered in Enugu metropolis ply the Enugu analysis of the data shows that average of 250 private vehicles ownship roads while some vehicles and motorcycles are registered annually in Enugu metropolis. This could be egistered outside Enugu town contribute to the number of projected to mean that about 1,250 private vehicles, 1069/ehicles using Enugu township roads. commercial vehicles and 1739 motorcycles will be registered in the next five years.

TABLE II Number of driving licenses issued in Enugu Metropolitan from 1994 to Nov.1999

	- · · · · · · · · · · · · · · · · · · ·							
Type	1994	1995	1996	1997	1998	1999	Total	
Private	187	168	205	194	226	214	619	
Commercial	210	364	481	444	495	460	143	
Total	388	364	481	444	495	460	163	

SOURCE: ENUGU STATE MOTOR REGISTRY

Closely associated to vehicle ownership and movement of vehicle is the issuance of driving license.

Table III shows the number of driving license issued yearly from 1994 to 1999.

http://www.ijesrt.com

The information contained in table II and III are not the true representation of vehicle ownership situation in Enugu. They, however, point to the fact that the stock of vehicles in Enugu metropolis and the operators are not

declining-a situation that sustains high traffic generation in Enugu metropolis.

4.4 Traffic situation in Enugu metropolis Number of vehicles observed per location

TABLE IV

Time	Abakaliki road IMT campus II axis	Zik Avenue/ Leventis	Agbani road/ Mayor Bus stop Axis
		Axis	
7-8am	975	1462	1550
8-9am	1400	2100	2500
9-10am	1010	1510	1720
10-11am	725	1427	1850
11-12am	520	1200	1250
12-1pm	600	1100	1150
1-2pm	650	1150	1200
2-3pm	900	1250	1303
3-4pm	1250	2000	2100
4-5pm	1043	2000	2150
5-6pm	1084	2195	2100
6-7pm	1113	2500	2708
7-8pm	1000	2730	3000

The volume of traffic in enugu is generally high going by survey carried out on the volume of traffic at three locations in enugu town. In table IV, the volume of traffic is highest in the morning hours from 8.00am to 10am and in the evening lately hours of the night from 4pm to 8pm. It was observed that enugu traffic experiences traffic congestion during the mentioned above, rush hours at certain locations namely; Abakpa market junction, main market/Old park, Zik avenue/CIC junction/Edozien axis, Ogui road/Chime avenue junction, Agbani road/Mayor junction and Trans-ekulu, Phase 6 junction.

It was also observed that motor cycle accidents are rampant in Enugu town especially at man market/Old park axis and Abakpa market junction and Nike road.

Findings, recommedation and conclusions Summary of findings

The author discovered that the traffic situation in Enugu metropolis is fair. It has the following to its credit;

- (a) The regional traffic is separated from Enugu Expressway and Enugu-Onitsha Expressway which bye passed Enugu metropolis and joined Enugu-Abakaliki road.
- (b) Some of the Enugu township roads are dualized and are wide enough to carry the traffic. Examples are Abakaliki road, Bisala road, Ogui road, Presidential road, Oconor road, Okpara Avenue.

- (c) Most of the roads within Enugu metropolis are of good quality and have the traffic congestion which uses to occur on them when they were bad.
- (d) The efficient work of traffic warden who helps to decongest the roads any time there is road congestion. However, there are traffic problems which the author identified which need to be tackled now either to improve on the present traffic situation in enugu metropolis or to check future deterioration of the traffic situation which may arise due to future increases in volume traffic.

These problems include:

- (a) Narrow streets: agbani road, zik avenue, chime avenue, school road, nike road and trans-ekulu/ekulu road are too narrow for the volume of traffic they carry. Most of the traffic congestion observed on these roads is due to the narrow roads services heavily built up areas. These roads were built when there were few cars. Considering the present traffic situation on these roads and the projections made in chapter four, increase in traffic situation is expected to be chaotic on these roads if no remedy is carried out.
- (b) Frequent road intersection: there are many road intercepts along zik avenue, Agbani and Chime avenue resulting to slow movement of traffic and hold up.
- (c) Levels railway crossing: The rail line cross Enugu township roads of four locations; the fire services at new market area, the Leventis area of Zik Avenue and Kenyetta, end of school road. Most of these areas are crossed to areas with traffic problems as vehicles have to stop whenever train is passing. There have also been

cases of accidents involving train and vehicles in some occasions.

- (d) Topographic constraints: this is mainly caused by the Udi Hill which stretches throughout the whole of Eastern part of Enugu metropolis thereby preventing the construction of a new road through that side which would have decongested Agbani road and Zik Avenue by relieving them some of their traffic.
- (e) Lack of parking space: This is prominent at the new market axis and is responsible for the traffic congestion found in that area.
- (f) Low coefficient of connectivity between working and residential areas: some residential areas are not well connected working areas.

For example, the whole of G.R.A, Trans-ekulu, Ekulu west, Ekulu east and Abakpa layouts are connected to the central business district through Ekulu road is too to carry the traffic. The Ekulu road is however complemented by Abakpa road through the army barracks. This is responsible for the traffic congestion frequently experienced at the junction of Ekulu road and Abakaliki road. The situation gets worse when the army gate is closed by 8pm everyday.

- (g) Driving habit of the most drivers: this is rampant with bus drivers, they flout traffic regulations and create traffic problem on Enugu urban roads.
- (h) Traffic marking and signal: this is scanty on enugu township roads.

Recommmedations

In the light of the problems identified in respect of traffic within Enugu metropolis, the following recommendations are offered:

Agbani road should be dualized to be able to carry the heavy volume of traffic on that road. Incidentally, there is enough road set back to accommodate an expansion of the road without too much compensation being paid in respect of structures or buildings that would have been affected by the exercise.

A round about is hereby being proposed of the Zik Avenue/Edozien street junction. This will reduce the congestion caused by frequent intersection of roads along Zik Avenue. With the round about, the congestion caused by the three close road intersection; CIC/Zik Avenue junction, Edozien/Zik Avenue junction and HRC/Zik Avenue junction would have been taken care of.

I also recommend the construction of fly-Over's across the four railway crossings which are earlier mentioned in this project. All the parks operating long distance transport services could be relocated at the outskirts of the town. In this light, all the parks being used by buses and taxis traveling to Anambra state and Ebonyi state located at the main market axis should be relocated to the new market area and at any location beyond the army barracks along the Abakaliki road respectively.

A high coefficient of connectivity between the GRA, Ekulu West, Trans-ekulu and Abakpa layout and the central business distinct could be created by constructing a road from Ogui junction near the army gate through the zoo to the junction of Nike Lake resort road and Enugu-Onitsha Expressway. This will complement the Ekulu road which is presently under heavy traffic pressure. The Zoo could be relocated to the outskirts of the town. This proposal no doubt may be expansion, but the traffic will be more considering the fact that Enugu metropolis is expanding toward Abakpa area and a heavy traffic is envisaged to be generated from that area in future.

The road safety commission should step up its activities in checking the excesses of drivers-mostly bus drivers and motorcyclists. An alcoholizer should be used frequently to dictate drivers of motorcyclists who are drunk while driving.

Finally, traffic signs and markings should be put in appropriate places so as to guide road users properly.

Conclusion

Inefficient traffic system slows down economic process and leads to the low productivity. Good road network improves standard of living as productivity is enhanced. In the above study, the author has outlined all the traffic facilities and operators within Enugu metropolis. The researcher examined the traffic situation in Enugu metropolis and judged it fair.

The author has been able to point out in the appropriate places through analysis, some of the shortcomings of Enugu traffic system and have recommended appropriate measures to corrects its deficiencies.

Despite some limitations that has faced in carrying out the research work like not being able to determine the number of vehicles within Enugu metropolis, the research taken serves as a frame work for future research and the findings and recommendation will form basis of solving the problem of traffic in Enugu metropolis now and in future.

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Urbanization is dynamic, traffic and urbanization are complementary. The basic facts established in this research therefore will always be a material for improving the dynamic traffic system of Enugu metropolis and a wheel for economic progress in future

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