

Enugu State Library - Architectural Approach to Preservation of Modern Data

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Abstract

A library is a reservoir of knowledge and is a store for the most vulnerable of man's creation and Ideas. The services of the public library cannot be overemphasized as a society which is known for reading is also known for advancement in various facets and ultimately is a literate society. The library in recent times has extended its services to not just preservation of knowledge in book form, but has also extended to the digital format which cannot rot or decay. However, the major reason for this project is to provide a sustainable modern state library in Enugu state to enhance the minds of the individuals within and without the state, to also serve the socio-cultural needs of the society. In the course of this research, problems which are linked to architecture will be encountered and steps to solving them will be proffered and implemented; certainly the major problem which needs much attention is the various ways needed to solve flexibility and adaptation to change in library designs. In order to find a lasting solution to these very problems, this research will anchor on a procedure which is deductive, that is, collection and analysis of primary and secondary data. This approach is based on the implementation of figures and inputs deducted from different case studies and oral interviews which have been viewed architecturally. This will be achieved in five chapters of this report with each chapter critically treating a subtopic. The general idea will be discussed and an insight on the historical development of the library both globally and locally will be treated, including reviews of related works. The facilities needed for proper functioning and other deductions will be further highlighted. All these in combination with other facts form the basis of this design.

Date of Submission: 15-01-2023

Date of Acceptance: 31-01-2023

I. INTRODUCTION

A state library is that which can safely be classified under public libraries. It is public because both the usage and funding of such a library is by the general public. This library can be described by first deciphering what a library is and its uses.

A library as defined by the Advanced Oxford Dictionary is an **institution** which **holds** books and/or other forms of **stored information for use** by the **public or** qualified people. The very essential points to note are that the library is an institution and it holds and stores information for use by the general public. Haven taken into consideration this definition, the project on Enugu state library refers to a public state library which will hold in store various documents which not only hold claims to Enugu state but also draws people from far and near for the purpose of research, discovery or study from within the confines of Enugu state and to every part of the globe from where there would be need for information.

1.1 BACKGROUND OF STUDY

It is paramount that knowledge be preserved, reviewed and also taught to the future generations in order that life may retain its meaning. As it is said, learning is pertinent at any age/stage in life. For this reason must man preserve knowledge, as the Chinese quote goes "The faintest ink is sharper than the sharpest brain." It is more wisdom to put down in writing the events of life for the learning experience of the generations yet unborn.

Knowledge being power is that which is most needed to improve any society. Information preserved in the form of books makes up 80% of the library. And as it is very important to write down, there is also a need to erect a house to preserve knowledge which has come to be known as the library. This forms the basis of this design project.

Preservation of knowledge cannot be overemphasized that is why in planning for libraries, a lot has to be considered. For various reasons, there is a need to erect sustainable monuments which will house events from one generation to another. These structures will not only be for access but will also give the next generation a view of challenges our generation faced and leave them with the task of continuing from where we stopped.

The architecture of erecting a public library does not only inspire reading, it also triggers reasoning because reading is closely linked with brain formation and liberation from mediocrity and timidity. This also inspires creativity in our society because when there is **focus**, there will be innovation, there will be a need to figure out the issues around us and find means of solving or combating them. In the fight against corruption, cyber crime, and examination malpractice which have advanced, the focusing of the mind towards its capabilities as according to 20th century explorers, known that the human mind can find functions for only 10% of his brain, a counter opinion in the BBC science focus magazine says that the findings of the 10% usage of the human mind is not giving humans enough credit for our capabilities. That is to say that if we could really access 100% or close to our brain functions, we could do more than commit vices when our minds are focused to achieve greatness. This is a very important aspect of development which has to be visited by the leading elites and statesmen, because it is said that a society with many public libraries is deemed a society with a high level of literate citizens and is filled with people who have the mind of civilization. A lot has been written down; taking twice the effort of reading to pen those words down through years and centuries, And the best part of preservation is that it will influence even those from the darkest part of the world to reason and learn.

The importance of the library around an African is not far from his low level of reading culture. The need for a state Library in Enugu is to get the minds of the citizens domicile in the state and even those abroad acquainted with reading not just about the western culture but also reading very important stuff about themselves. These steps towards achieving this aim if implemented properly will yield results in a few years as it was in the western world in years past. Libraries abroad are patronized not just by students but also by even the uneducated, and the layman, but because of the level of literacy, those who can read and write outnumber those who cannot and this is the aim of erecting a public library. As illiteracy is synonymous to ignorance, it is no doubt an important step to liberating even the rural dwellers as well as the urban dwellers of various provinces around West Africa, Nigeria, Enugu and ultimately around the man who dwells therein. Erecting public libraries will curb the greatest impediment to development which is ignorance.

In achieving this, the structure so erected must be able to catch the interest of man as he is moved by what he sees, portray meaning, appeal aesthetically and attract the mind to its confines, because whatever pleases the heart attracts it, as the Igbo Adage goes, “where the eye is, is where the mind will be”. These two components are inseparably linked and form the basis of this study in drawing close to the human mind in such a way as to seek improvement thereby restoring the dignity of man.

1.2 STATEMENT OF PROBLEM

To properly ensure that designs in libraries are done properly there are certain problems to look out for and these are as follows.

1.2.1 LOCATION

The importance of any public library is attached to its location. The location will influence the use. It will further increase the number of users and also a centrally located library will have to draw attention, the curiosity of man will first draw him to use this established institute and this is the major aim of a library. A remote library will be seldom visited.

1.2.2 SECURITY

For the books which are termed “property of the general public” to be properly handled and last long, the library design must make provision for security for books. Stacking and shelving is quite an important aspect of library designs, as the manner in which they are stacked and shelved determine how they’ll be used and accessed, if stacked in the wrong manner, the books will wear and tear.

1.2.3 SPACE

Space has come to become a major issue to library designs. Architecturally, when people are unable to access much space, they limit the use of certain spaces in the entire facility. Elaborate space designs to not just contain but to also allow access to various established spaces is very crucial and important. This will also allow the library assistant to know the various activities going on in the library.

1.2.4 LIGHTING

The inability of readers to access light will demean the use of libraries by readers. Proper lighting at all sides will increase productivity to the maximum as working hours will increase and there will be a level of satisfaction in the usage of libraries.

1.2.5 VENTILATION

To read and for proper assimilation of what has been downloaded, comfort is very necessary, the one reading should not be tensed or discomforted at any time. Therefore when one is reading and sweating, there is no reading at all. When humans experience or are subjected to a low ventilated space, the first instincts are to leave and search for air, this will make people want to read outside or borrow books alone and read in their homes for leisure. If all who come to read in libraries end up borrowing, then the library will remain empty and this is a major problem to library designs.

1.2.6 SOUND ACOUSTICS

The management of sound in libraries is very important as the head body and mind need to be attuned in such a way that there are no/ minimal distractions so as to ensure optimal concentration. A problem to libraries is improper sound attunement. The spaces should be acoustically inclined as touching the various indoor noise sources such as the floors. A library floor should be finished with a sound inert material so as not to distract the reader as someone enters the library, and also the walls should be designed to absorb and transmit noise to the outside and not to reflect them. Also the ceilings should be acoustically treated. The use of sound reflectors should be considered so that even noise from the outside will not be thrown in, but that the incoming noise be ejected outside the library space and even ultimately the reading hall. These steps are in lieu with the ethics of creating sustainable designs for proper reading.

1.3 AIM/OBJECTIVES OF STUDY

1.3.1 AIM

There are numerous reasons attached to designing a state library, but for this study the aim is to catch the interest of readers both young and old who will spend time reading books in the state library. To appeal to the minds of readers to both appreciate architecture and knowledge.

1.3.2 OBJECTIVES

In achieving the above aim, there are a chain of objectives to it. These are as follows.

1.3.3 INCULCATING CULTURAL DESIGNS

As much as man can be taken away from his cultural base, his culture cannot be taken away from him. We have always had places of scholastic acquisition down the track of our history. Historically, palaces had their separate designs which provided spaces for preservation of artifacts and warfare. Also the ancient shrines of old were for learning and preservation of knowledge and history by the ancient priest. Drawing inspiration from these ancient historical designs, there will be a link between the old and new and will improve our cultural base. This is a medium to draw people closer.

1.3.4 AESTHETICS

Once it is beautiful, it must draw people closer to make use of this space. The aesthetics is a functional requirement of a good structure.

1.3.5 LOCATION

A central location which can be located by the various users around this library will be chosen for the design.

As much as the architect plays his role in creating an eye-catching functional design, the general public has to be sensitized on the importance of reading through schools and other public address media without which the design will be neglected.

1.4. RESEARCH QUESTIONS

In getting the interest of man, the tactical approach reaches areas such as;

Does everyone have an interest in reading?

Does cultural inculcation into library designs pose to be the best approach?

Even if a certain number of people want involvement in cultural related issues, will others want involvement? But the aim is to create room for versatility in an approach to bring people back to their reading through architectural means. Further down it will be seen that this approach is inborn in us culturally and not fearsome.

Even aesthetics is relative, what looks beautiful to A might not look the same to B. In this term, it is left to the observer to decide because what has been termed architecturally beautiful and aesthetically appealing has crossed the third eye of observation and hence should appeal to a larger percentage of the general public.

How else can location be chosen if not a central place which is termed or seen as the core area with minimal noise and improved accessibility from any part of the area? This is the major impediment in library or commercial designs.

When all these questions have been considered then there is another important question which should be asked. For what capacity is this Library for? In accordance with the 2006 population census, Enugu state population was 3,267,837 and in the metropolitan areas the population is was pegged at 722,664 people and working with these statistical figures, currently after 13years, having a population growth of +1.54% per year, Enugu urban in 2019 is 867,341 persons and a design of a capacity of 500 and also an unlimited bookshelves properly stacked with an e-learning facility for electronic use of libraries.

1.5. SIGNIFICANCE OF STUDY

Generally beneficial for mind improvement and awareness

Architecturally for participation in research work as the architect is knowledgeable in all things

To create a society of enlightened citizens- lack of study equals decay of the mind.

Massive orientation of the general public and eradication to the barest minimum of mediocrity

Reduction in apathy

Increase in political involvement and socialization

Increase in social appreciation of architecture and beauty

This study is one which benefits all and sundry as it stretches to various areas touching both the academic sphere and the political area of knowledge and awareness through journal and newspaper and magazines from different times as long as the library has existed.

1.6. SCOPE OF STUDY

The scope of this study will rest on the following

- An administration
- Referencing section
- Lending services
- Skill acquisition
- E-learning/CBT platforms
- General reading hall
- Bindery section
- Cataloging section
- Physically challenging library
- Circulation
- Serial section
- Africana/ Nigeriana section
- Archives
- Conveniences

1.7 STUDY PLAN

This research/study will concentrate on seeking out various forms of creating a sustainable design for Enugu state library and the steps involved in achieving it. This study will cover 4 chapters, having a detailed setup of form and function playing an intertwined and complementary role in proving the seemingly hard to be soft and with the processes to be followed in the latter chapters.

II. LITERATURE REVIEW

2.1.1 History of Public Libraries:

Even before the creation of formally packaged libraries, homes and communities have had the essential orientation to preserve knowledge, as community stakeholders have been involved in historical preservation and this form of knowledge can be said to be oral as passed from person to person. Only the eldest, the wisest, the bravest or even the king had the responsibility of being the live oracle to very confidential details as linked with the community, and this privilege was passed down from generation to generation.

When writing was discovered, volumes upon volumes of scribed works were made and there arose a need for both private and public preservation of knowledge in the form of libraries.

The oldest recorded public library occurred in Al-hakim biAmar Allah (reigned from 996 – 1021 AD) who financed and established libraries open to the public, where anyone, even the simple layman could choose whatever books they wanted and have them copied for them by public scribes, free of charge. Also in Cesena, Italy, the first community-run public library, the MALATESTIANA library, was established in 1447, provided both secular and religious texts in Latin, Greek and Hebrew, and was fully open to all members of the public.

Other earliest public libraries include that of Kalendars or Kalenderies, a brotherhood of clergy and laity who were attached to the church of All-Halloween or All saints in Bristol, England in 1464. Also in the enlightenment era Claude Sallier, the French philologist and churchman, operated an early form of public library in the town of Saulieu from 1737 – 1750. He wished to make culture and learning accessible to all people. At the start of the 18th century, libraries were becoming increasingly popular and were more frequently lending libraries. The 18th century saw the switch from closed parochial libraries to lending libraries.

2.1.2 Pan African evolution of libraries

There was found within the Igbo, Ekoid, Ibibio and Efik, in the Pre-15th century a writing system of symbols indigenous to what is now the southeastern Nigeria, called **Nsibidi** also known as **Nsibiri**, **Nchibiddi** or **Nchibiddy** that are apparently pictograms (picture that represents a word or an idea by illustration), though there have been suggestions that some are logograms (a character or symbol that represents a word or phrase e.g. a character of the Chinese writing system) or syllabograms (a symbol that represents a syllable). The symbols are at least several centuries' old- early forms. History has it that they were once taught to children in schools of such era as excavated with a range of dates from 400 to 1400 CE. With this fact these writings were written down and recorded and stored for the use of the general public. There are thousands of Nsibidi symbols, of which over 500 have been recorded. Due to the British colonization, western education and introduction of Christianity, the Nsibidi-literate people drastically reduced leaving the secret society members as some of the literate in the symbols. Nsibidi was and still remains a means of transmitting Ekpe symbolism. Nsibidi was transported to Cuba and Haiti via the Atlantic slave trade, where it developed into the **Anaforuana** and **veve** symbols respectively.

This further defies the fallacy that Africans and Africa had no culture, history or writings before the exploitive era of the white man. According to an excerpt as edited in Wikipedia, 2019, the first libraries appeared 5000 years ago in southwest Asia's fertile crescent, the area that ran from Mesopotamia to the Nile in Africa, known as the cradle of civilization, the fertile crescent was the birthplace of writing , sometime before 3000BC (Murray, Stuart A.P)

2.1.3 Classifications of libraries

There are two ways in which libraries can be classified:

- I. Institutional framework: this is by ownership or by purpose. For example, National Library, country or municipal libraries, academic research libraries, industrial, club, private library, hospital and welfare library, prison library, etc
- II. Specialty: this is by content. For Example, special libraries including architectural, medical, legal, theological, scientific, engineering, music etc.

To further express the above classifications the types of libraries listed above would be expressed with examples below.

- a) National library: examples include national library, Enugu, Abuja, Lagos, Library of congress, Washington D.C, National Library of China, etc
- b) State library: for example, Enugu state central library, Abia state library, state Library Calabar, Lagos state Library, Shanghai central Library China.
- c) Research library: for example, hospital Libraries, Scientific Libraries, etc.
- d) Academic libraries
- e) Private libraries
- f) Mobile libraries
- g) Archives

2.2 DEFINITION OF SPECIAL TERMS

2.2.1 CIRCULATION

Bar code number

The 14 digit number appearing beneath the barcode found in the beginning or endpapers of a book.

Circulation Desk:

A service desk where books and other materials are loaned or changed out to library users. Library materials which do not circulate (reference books and some periodicals, for example) can be used within the Library.

Recall

Library users may place recalls on books charged out to other people. The people to whom the materials are changed are notified by mail that another library user wants the book.

Renewal

An extension of the loan period for charged library materials. Renewals may be handled in person at the circulation desk, by phone, or by clicking on the patron button.

2.2.2 REFERENCE

Bibliography

A bibliography is a list of citations for books, periodical articles in books, theses, and other materials. Published bibliographies on specific subjects are often found at the end of articles and entries in reference books, the presence of bibliography is one of the signs of work of scholarship as opposed to a popular work, for example.

Citation

Information which fully identifies a publication: a complete citation usually including author, title, name of journal (if the citation is to an article) or publisher and place of publication (if to a book), and date. Often pages, volumes numbers, and other information will be included in a citation.

Reference

A special department within a library, where library users can find librarians, reference assistants, and a collection of reference materials to help users in research.

Reference collection

A selection of networked, CD-ROM, and printed library materials used by reference librarians and reference assistants to help people find information or to do research. Reference collections contain many sources of information, such as encyclopedias, dictionaries, almanacs, directories, or statistical compilations. They may also have bibliographies, indexes, and abstracts.

2.2.3 LOCATION MATERIALS

Call number

Each item in a library collection is classified in a subject area by assigning it a call number. These call numbers are placed on the spine of the book or bound journal. These books or bound journals are shelved by these call numbers in stack

Card catalog

Card catalogs are pieces of furniture containing drawers filled with cards that provide information about materials in the collection.

Cross reference

A term used in catalogs, thesauruses, reference books, and indexes to lead you from one form of entry to another.

Stacks

The stacks are the part of the library which houses the physical collection. The books and periodicals are arranged on shelves in the stacks

Thesaurus

A list of the subject headings or descriptors used in a particular database, catalog, or index.

2.2.4 KIND OF MATERIALS

Microforms

Documents, often ones that are bulky or liable to deteriorate rapidly, which have been photographed and reduced in size to preserve them and to reduce the storage space required. Common forms for microforms are microfilms, microfiche, and micro-cards.

Periodicals

Publications which are issued at least twice a year, including journals, magazines and newspapers. Current periodicals are those which have recently arrived and are usually kept in loose binders, or on open shelves.

Serial

Publications that appear more or less regularly-daily, weekly, monthly, quarterly, annually, or biennially, for example, newspapers, journals, magazines, and almanacs are all examples of serials.

2.3 CONCEPTUAL FRAMEWORK

It is pertinent in every generation to preserve knowledge, it is also very important beyond words to enlighten people on the importance of reading. The library usage is popular only amongst students and undergraduates and finds low usage amongst the business class. The use of libraries is not and should not be restricted to only the students; it should extend to other groups which make up the citizenry. Through the years, this gap has been and it is high time it be filled.

The unavailability of good study centers and public libraries have caused many students to be regimented to what only their lecturers have to offer. In a situation where the required learning materials are not available or far from students, they stand to lose at both ends, thereby affecting the students and the society at large, thus affecting the economy.

It may rather be termed a mindset that the library is restricted to just books, but in fact, the library is not just a book storage facility, but has other interesting facilities. These services extend even to skill acquisition, research; therapeutic ends such as the handicap libraries, braille library, etc. When the citizenry is unaware of these functions of the library, it seems difficult to attract it to the library. And to a great extent, the already existing libraries have not been able to meet these standards of world class libraries, thereby restricting library usage to just reading.

In this study, it will be pertinent to address such issues which will make the usage of the state library improved. This is in lieu with not just finding results but also to have a populace of greater enlightenment.

The library design is not one which is new to the ear or mind, it has been for years and still will, but behind this research is a special need to cover some gaps which have been ignored in times past, the formation of ease and access in the modern library designs, the need for interesting facilities within the library, e.g. skill acquisition, scholarship opportunities, information galleries, children Libraries, etc. will further create an atmosphere of interest, not following the already visited libraries. The need for clear aerated spaces with maximum lighting (whether natural or artificial) to increase productivity, the reduction in noise production of both floor materials or other materials announcing the entrance of users, thereby reducing distraction for users of the library. These are the major factors that inspire this research and it aims to shorten the gap thus far. Therefore a structure which must be open for free and equal use by all members of the society regardless of race colour, nationality, sex, age, religion, language, status or educational attainment, is needed to help display the culture of our society.

2.4 CASE STUDIES/ REVIEW OF RELATED

2.4.1 NATIONAL LIBRARY, ENUGU.

Location – NTA road, beside ESBS junction, Enugu

Date of commissioning – Year 1970

Capacity – collection of above 7000 items.

Total perimeter – 436.69m



Figure 1 Approach view of National library, Enugu.

STRUCTURE

The library is a storey with a central entrance showing the lobby and two wings announcing the reading area and the administrative area, and a compound with a pronounced landscape, and a detached canteen.

FACILITIES

I. Ground floor –

Right wing

Reception, Reference section, Nigerian section, Conveniences, Stairs.

Left wing

Stores, ICT centre, accounts, secretary to director, conveniences, director's office.



Figure 2: A cross section of readers in the library.

First floor – central gallery, series section, board room, reception hall, kitchen, store, conveniences



Figure 3: Arrangement of shelves accordingly.

Merits

- Overall functional layout
- Acoustic consideration on floors and handrails
- Fenestrations for improved ventilation
- Elaborate glazed windows for improved lighting
- Two number elaborate stair elevation to the upper floor
- Considerably high headroom of about 8.5 m for air recycling
- Accessible seating arrangement for ease of entrance and egress

Demerits

- No bindery section for worn out books
- Inadequate parking area
- No distinction between categories of users, e.g. children, physically challenged, adult readers.
- Restricted number of users per time, causing overflow with some seen reading outside.
- Inadequate general usable spaces to cater for people
- Lacks some other improved facilities such as the skill acquisition, audiovisual, etc
- Its roof is improperly done and is open to the sky thereby has rendered the conference room unusable at the moment and its floor tiles scraping on its own.

2.5.2 ENUGU STATE CENTRAL LIBRARY, ENUGU, NIGERIA

Project Architect – James cubit and partners

Client – Eastern region government

Date of commissioning – 9th July, 1958

Location – No 4 market road, Ogui, Enugu, Enugu state.

Capacity – collection of over 11000 items

Total perimeter – 427.936m



Figure 4 Front elevation of central Library, Enugu.



Figure 5: Front façade continues.

STRUCTURE

The library is a storey building with a mezzanine floor.

FACILITIES

- I. Ground floor – children library, entrance porch, check point, circulation and control desk, staff library, cyber café, reference section, adult lending, exhibition, technical service division, bindery, librarians office, garage, works department.

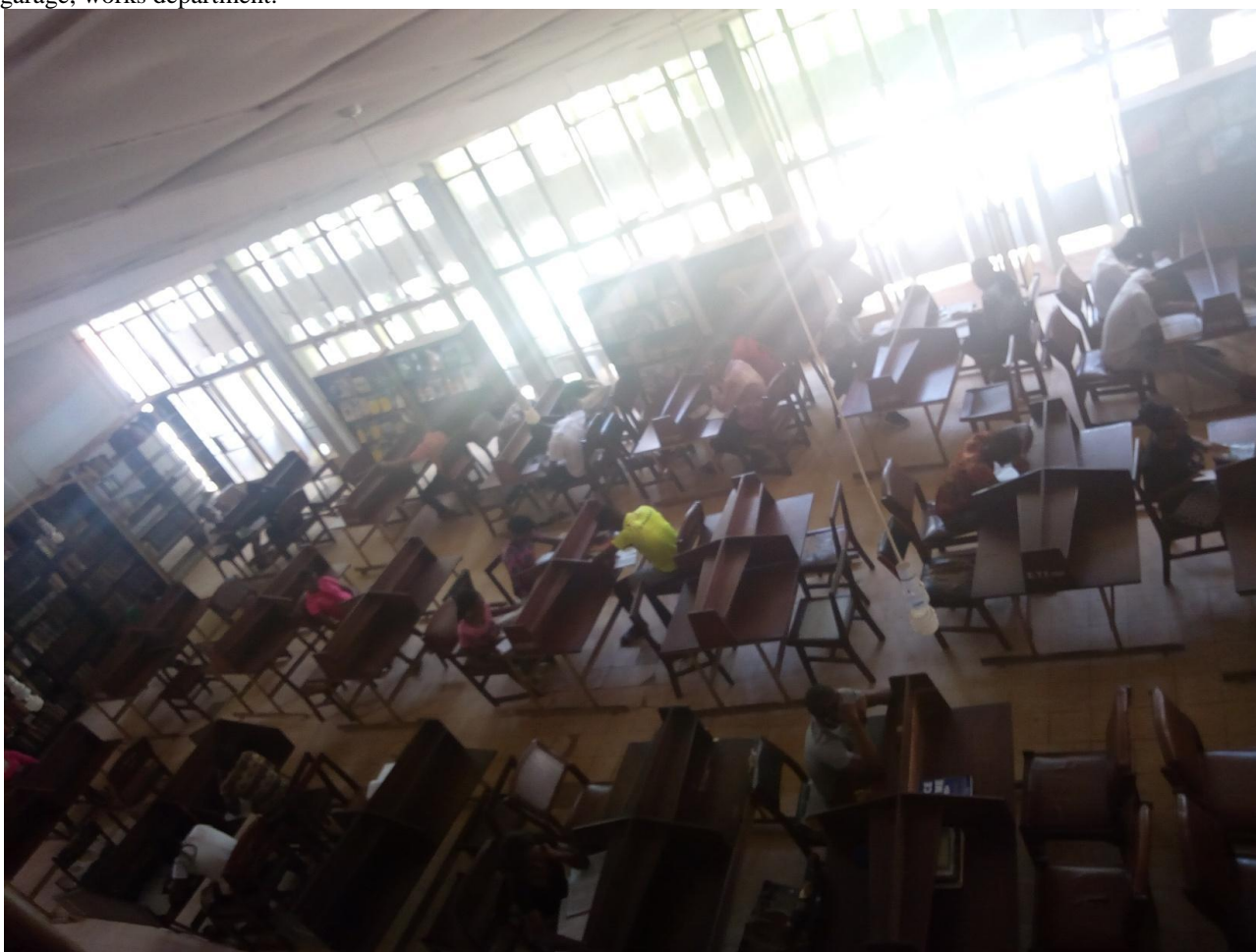


Figure 6: A cross section of readers in the Library.

Mezzanine floor – Nigerian.

First floor – director’s office, secretary to the board, accounts department, stores, chief executive officer, public relations officer, boardroom and conveniences for staff.



Figure 7: The Nigerian section.

Merits:

- Of good aesthetic features
- Proper use of sun shading devices and wide windows that allow adequate natural lighting
- The security unit is centrally located
- Sun glare was adequately controlled by the use of sun breakers
- Arrangement of seats for ease of movement
- A recommended arrangement of shelves around the seating area such that a reader does not travel long distances to seek books.
- The use of wood tiles on the floor to absorb sound, this is an acoustic approach to sound treatment.
- The provision of a garage for delivery of books in case of rainy seasons
- The sun breakers also serve as sound reflectors to throw off noise incident on the library thus reducing distraction

Demerits:

- The site is located in a noisy area; as it is just 20m away from the main market Ogbete.
- Very little parking lot for both the staff and library users
- There is no provision for future expansion
- The design is both colonial and was made for the population at that time, thus is no more fit to accommodate the population of today
- Not enough reading halls
- The ICT or cyber Café is an after-though as it was not originally in the plan of 1958
- No lobbies, except for one which has been darkened for the reason of the added ICT room.
- The Nigerian section which is a mezzanine floor houses hot air as it is close to the roof and not much acoustic consideration was made to the roof to expel heat from the internal spaces.
- No outdoor reading spaces
- Little provision was made for the landscape

2.5.3 NNAMDI AZIKIWE LIBRARY, UNN, ENUGU STATE

Client – University of Nigeria

Date of commissioning – Library began in 1960, but moved to a much bigger building on 9th March, 2009, which was started in 1982.

Location – UNN

Capacity – 735,157 collection of books and 99, 760 bound volume of journals

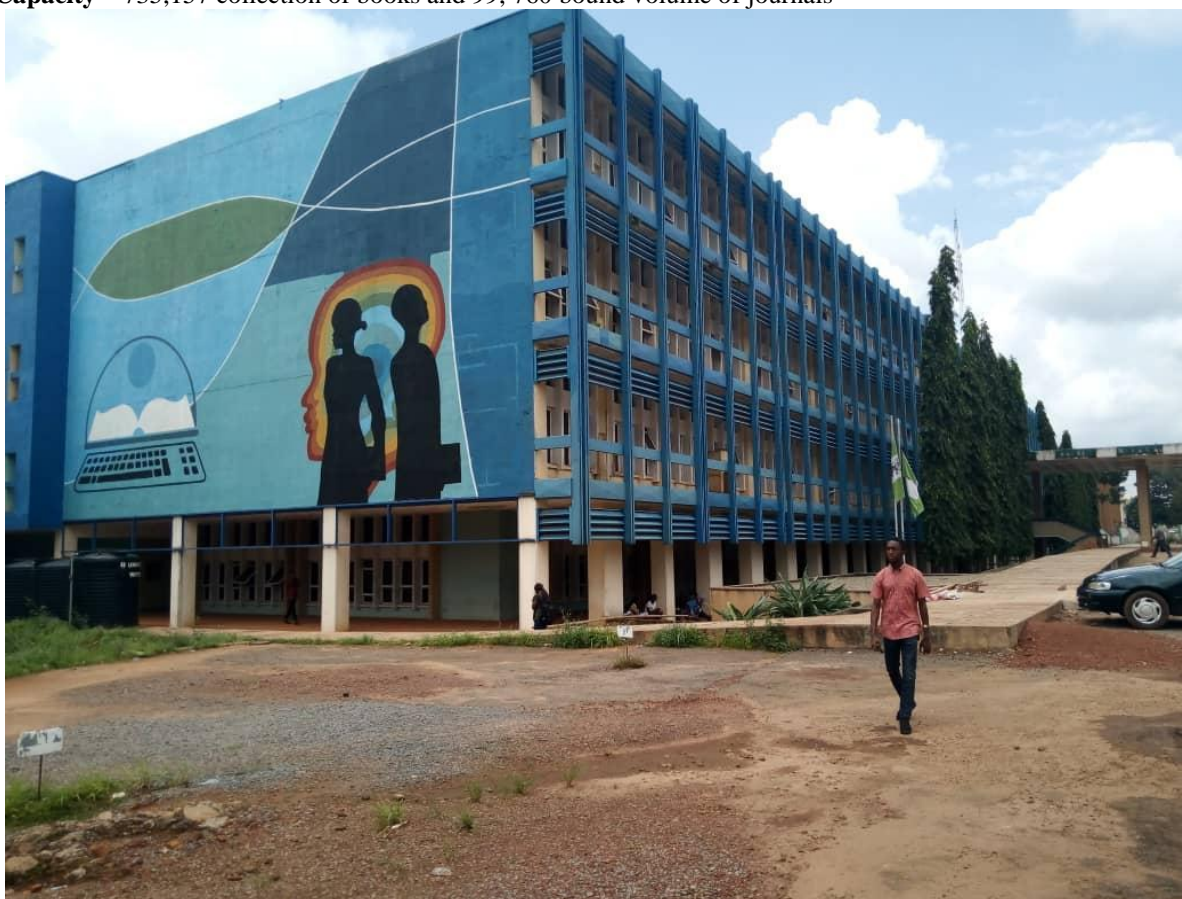


Figure 8: perspective view of Nnamdi Azikiwe Library, UNN.

STRUCTURE:

It is a four floors building, which includes a basement or ground floor, a first floor and two other upper floors.

FACILITIES:

Basement – skill acquisition, physically challenged library, acquisition section, cataloging/classification section, exhibition centre, bindery section, Bibliography, conveniences

First floor – Reference section, circulation, reading halls, OPAC (online public access catalog), administration, conveniences



Figure 9: Entrance to Serial section.

Second floor - serial section to the left, social science libraries/ humanity to the right

Third floor – CBT center to the right, Africana/Nigeriana section, United Nations and Government document archives to the left.

Merits:

- Aesthetically appealing
- Centrally located to the readers
- Use of sunshades to throw off sun/heat
- A courtyard for both lighting and ventilation through the complex structure
- Application of the waffle grid to have large spanned areas for reading
- An elaborate parking lot
- An entrance for both staff and users
- This is the biggest and best in west Africa
- Spaces are properly lighted; both naturally and artificially
- Proper consideration was made for the physically challenged and also has a skill acquisition space too

Demerits:

- Has uncompleted areas (such as the area made for lifts; this was not completed and is left bare). Therefore poses as a dangerous zone in a public space
- The basements are rather too dark for reading
- Ventilation through the basements are for a limited number of users, but when overflows, there is congestion of air.



Figure 10: Front Elevation.

2.5.4 NATIONAL LIBRARY OF CHINA

Project architect – KSP Jurgen Engel

Client – People’s Republic of China

Date of commissioning – 1909

Location – Beijing, China

Capacity – 12million books and a total of 37 million Items

Area covered – 80,000m²



Figure 11: Front elevation of National Library of China.

STRUCTURE:

This structure consists of a solid base, a glazed centre section enclosing structural cores and a steel-clad volume at the top. The stone-clad plinth houses the books and documents. The glazed centre section accommodates the public information area, access to reading rooms, foyer and cafeteria – all activities anchored to the present. The steel box at the top houses the digital library. Weighing 10,388 tons, the 120 x 105m earthquake-proof steel of the roof structure is designed as a steel lattice framework.

Facts

- 110years old from 1909 to 2019
- Collection of over 37million items
- Largest in Asia and third largest national library in the world
- Collection of over 115 distinct languages
- Houses ancient manuscripts, block printed volumes
- Rare and previous documents and records from past dynasties in Chinese history
- Runs from 9am to 9pm on weekdays and 9am to 5pm on weekends



Figure 12: A cross section of Readers at the National Library of China.

Merits:

- Aesthetically appealing
- Good acoustic considerations
- Good floor and wall finishes
- Elaborate spaces for reading
- Adequate future planning considerations
- Adequate lighting for increased productivity
- Ventilation is duly considered; both natural and mechanical, but in certain areas mechanical ventilation is applied.

Demerits:

- Architecturally over detailed and formal
- Building is recessed far from the entrance, such that one travels far to be able to access the structure. This is a minus in cases of rain or other cases where library users need shelter quickly.
- Too much attention to aesthetics than to function



Figure 13: Perspective View of The National Library of China.

2.5.5 LIBRARY OF CONGRESS, WASHINGTON D.C

Project architects – Alfred Easton Poor, Paul J. Pelz

Client – United States of America

Date of commissioning – 4th of April, 1800

Location – Capitol Hill, Washington D.C

Capacity – 38 million books, 3.6 million records, 14 million photographs, 5.5 million pieces of sheet music, 70 million manuscripts, 5711 incunabula, 123 million unclassified items. A total of 167 million items

Area covered – over 1.349km² land area



Figure 14: Front Elevation of the Library of Congress, Capitol Hill, Washington DC, USA

Facts:

- Largest library in the world
- Largest national audio-visual conservation centre in the world
- Holding of items in over 470 languages
- Serves a population of 535 members of congress, staff and American citizenry
- Has 838miles of bookshelves
- Braille library program provided to more than 766,000 Americans

Merits:

- Aesthetically appealing
- Very high headroom for considerable architectural reasons
- Proper lit reading spaces for increased productivity
- Elaborate windows for ventilation
- Floor acoustic considerations
- Circular form used for proper sound propagation.
- Colonnaded spaces for spanning

Demerits:

- Heavy and rigid design
- Short spaces spanned

2.6 Summary

Summarily, the above reviewed works were generally analyzed to suit the standards of the era in which they were designed. But it is also pertinent to note that quite a number of the above works did not make much consideration for future expansion, which has come to create a need for more elaborate designs that will suit the current day and age.

Furthermore, noted is the absence of very functional areas in the local case study; such areas include the bindery sections and physically challenged library which are also very important for every member of the public.

Again, in the conducted foreign case studies, it is more clear that very much consideration was made for space and for also collection of books, witnessing to the fact that in order to build a library, there must be much space and considerations given to book storage, thereby creating elaborate spaces for stacking and shelving. Noted also is the availability of activities which will draw people closer to the library as the world is rapidly digitizing. These include ICT and research facilities.

III. Geographical Location

The geographical location of the study area is at the National Museum of unity, Enugu. Located at 65 Abakiliki Road, Ogui junction GRA [Blueberries park], Enugu.

The city of Enugu is the capital of Enugu. Enugu is a state in South Eastern Nigeria, created in 1991 from part of Anambra state. It is located at the foot of the Udi plateau. The state shares a border with Abia state and Imo state to the south, Ebonyi state to the northwest and Anambra state to the west.

Enugu is on the railroad from port Harcourt, 150 miles [240km] south-west, and at the intersection of roads from Abia, Onitsha, and Abakaliki. It is approximately 4 driving hours away from port Harcourt, where coal shipments existed in Nigeria.

Enugu is within two hours' drive from Onitsha, which is one of the biggest commercial cities in Africa and three hour's drive from Abia, another very large commercial city, both of which are trading centres in Nigeria. The average temperature in this city is cooler to mild [60 degrees Fahrenheit] in its cooler months and gets warmer to hot in its warmer months [upper 80 degrees Fahrenheit] and very good for outdoor activities.



Figure 15: Highlight of the location of Enugu in Nigeria

Bounding Neighbours:

The study area is situated near the Old Governor's Lodge, Abakiliki road and close to the Army barracks. Enugu is bounded by the states of Kogi and Benue to the north, Ebonyi to the east, Abia to the west.

The Local Government Area:

The study area is sited at the Enugu North Local Government.

3.2 Brief History of Study Area

This was mapped out by the government in 1972 after the Nigerian civil war and was previously used as the state's zoo. The name of the state was derived from its capital city, Enugu. The word "Enugu" [from Enu Ugwu] means 'the top of the hill'. The first European settlers arrived in the area in 1909, led by a British mining engineer named Albert Kitson. In a quest for silver, he discovered coal in the Udi ridge.

The colonial governor of Nigeria, Fredrick Lugard took interest in the discovery, and by 1914 the first shipment of coal was made to Britain. As mining activities increased in the area, a permanent cosmopolitan settlement emerged, supported by a railway system.

Enugu acquired township status in 1917 and became strategic to British interests. Foreign businesses began to move into Enugu, the most notable of which were John Holt, Kingsway stores, the British bank of West Africa and the United Africa Company.

Enugu made it possible for the British administration to spread its influence over the southern province of Nigeria. The colonial past of Enugu is today evidenced by the Georgian types and meandering narrow within the

residential area originally reserved for the whites, an area which is today called **Government Reserved Area [GRA]**.

From being the capital of the Southern province, Enugu became the capital of the eastern region [now divided into nine states], the capital of now defunct federal republic of Biafra, thereafter, the capital of east central state through a process of state creation and diffusion of administrative authority.



Figure 16: A cross section of the Settlements in Enugu

Population: Enugu state had a population of 3,267,837 people at the census held in 2006 [estimated at over 3.8 million in 2012]. It is home of the Igbo of south eastern and few Idoma/Igala people in Ette [igbo-eze north] of Enugu state, Nigeria.

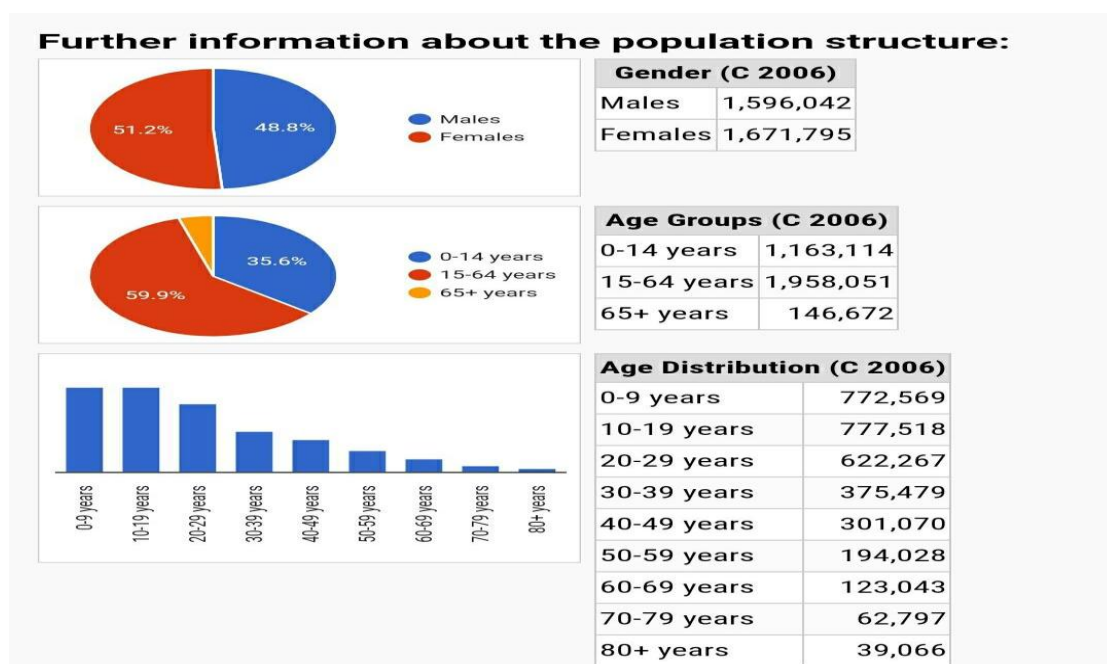


Figure 17: the Population Structure of Enugu

The Economy:

Economically, the state is predominantly rural and agrarian, with a substantial proportion of its working population engaged in farming, although trading [18.8%] and services [12.9%] are also important.

In the urban areas trading is the dominant occupation, followed by services. A small proportion of the population is also engaged in manufacturing activities, with the most pronounced among them located in Enugu, Oji, Nlebedim and Nsukka.

The state boasts of a number of markets especially at each of the divisional headquarters, prominent of which is the Ogbete main market in the state capital, Enugu.

There is also one of the largest grains markets east of Niger, the Orié Orba market which plays host to most farmers from the north central state of Benue, Kogi, Nasarawa and Plateau who used the market to dispose of their produce for consumers in south-east and south-southern Nigeria. Every four days, grains and other farm produce are found in large quantities and at highly competitive prices.

3.3 Climatic Studies

Enugu is located in a tropical rain forest zone with a derived savannah. The city has a tropical savanna climate. Enugu's climate is humid and this humidity is at its highest between March and November. For the whole of Enugu state the mean daily temperature is 26.7.c [80.1.f].

The state in general has a tropical climate marked by two distinct seasons.

- **Dry Season**
- **Raining Season**

Dry Season:

Dry season occurs between November and April and the Raining season begins in April and lasts till October. August is commonly known for its "august break". Then from December to February the dry Harmattan wind blows over the state.

Rainfall:

The annual rainfall in Enugu state is between 1.5 and 2 meters. The dry season is usually hotter than the rainy period and lasts between November and April. The lowest rainfall of about 16mm is normal in February.



Figure 18: Graphical representation of Average rainfall in Enugu.

Humidity:

The relative humidity of the town is high all year round with an average monthly range of between 75% and 90%. The lowest humidity occurs in December and January while the highest is in the month of July.

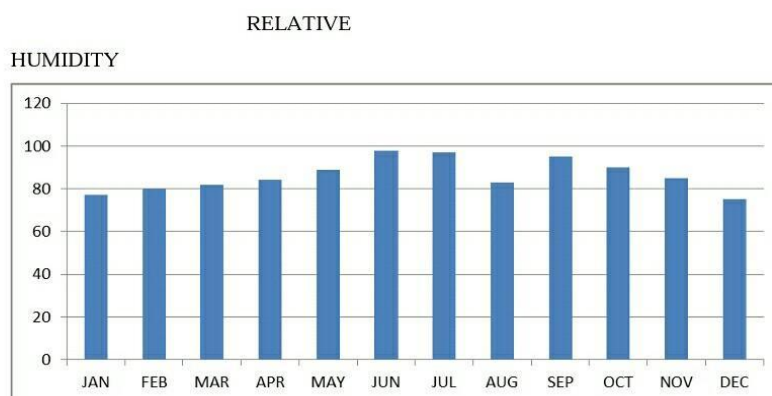


Figure 19: Relative Humidity.

Temperature:

The mean temperature in Enugu state in the hottest month of February is about 87.16.f [30.64.c] while the lowest temperature occurs in the month of November, reaching 60.54.f [15.86.c].

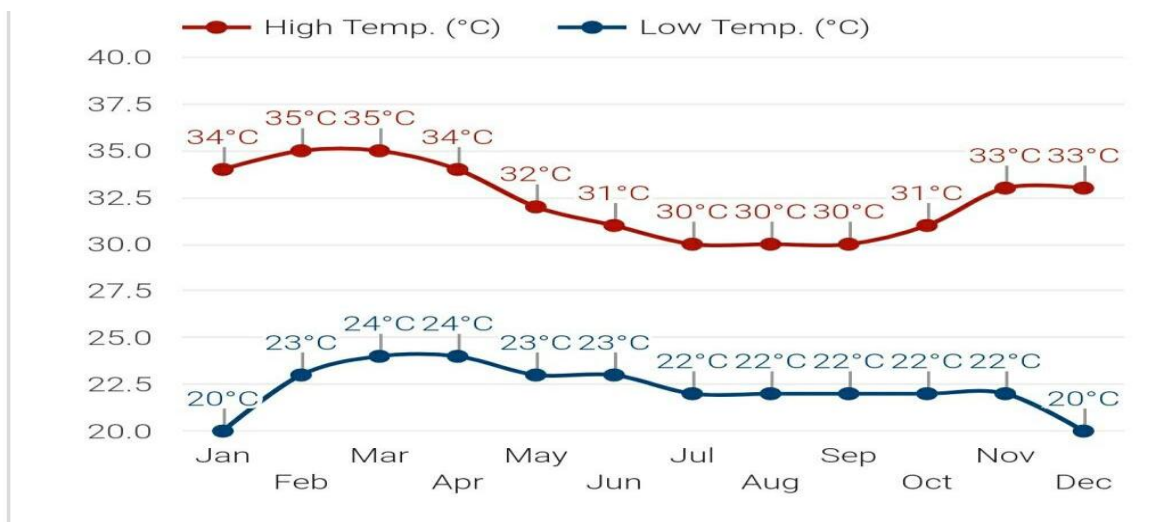


Figure 20: Relative Temperature within Enugu.

Wind:

The prevailing wind in Enugu is southwest and northeast trade winds. Therefore, orienting buildings in an east-west direction will not allow good air flow through it. Parallel to the building, while the rest will go through the building.

Soil:

Enugu has good soil land and climatic conditions all year round, sitting at about 222 meters [732 FT] above sea level, and the soil is well drained during its rainy seasons.

Vegetation:

The vegetation in Enugu state lies in two main vegetation zones. The woodland and tall grass savannah and the rain forest.

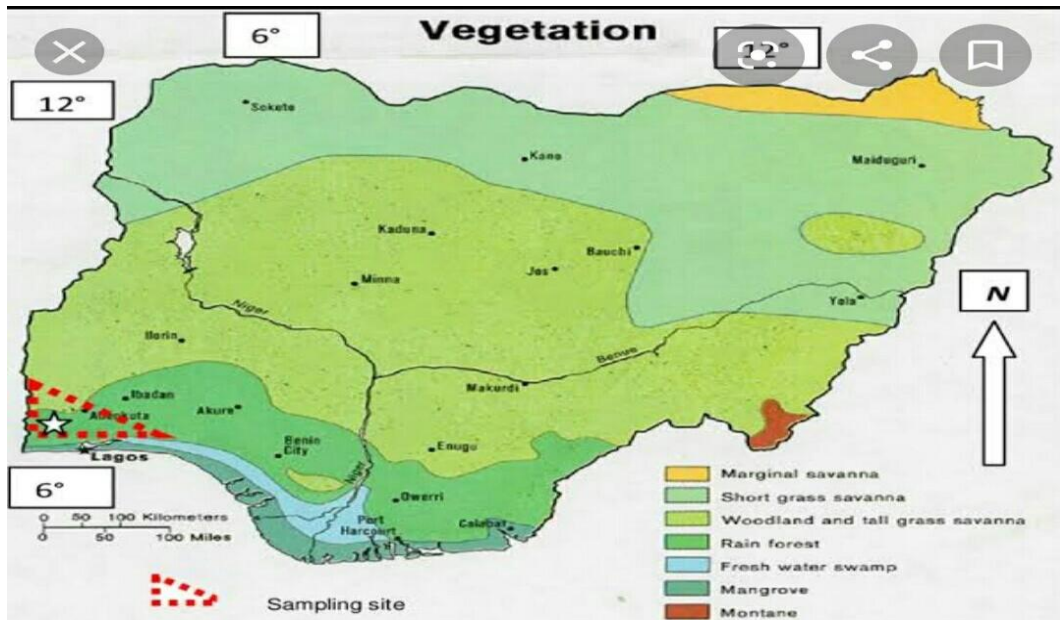


Figure 21: Vegetation Map of Nigeria.

Geology:

The Enugu shale is carbonaceous, fissile, gray and joined with beds of siltstone and clay. The MAMU formation contains a distinctive assemblage of sandstone, shale, mudstone and sandy shale with coal seams at several horizons.

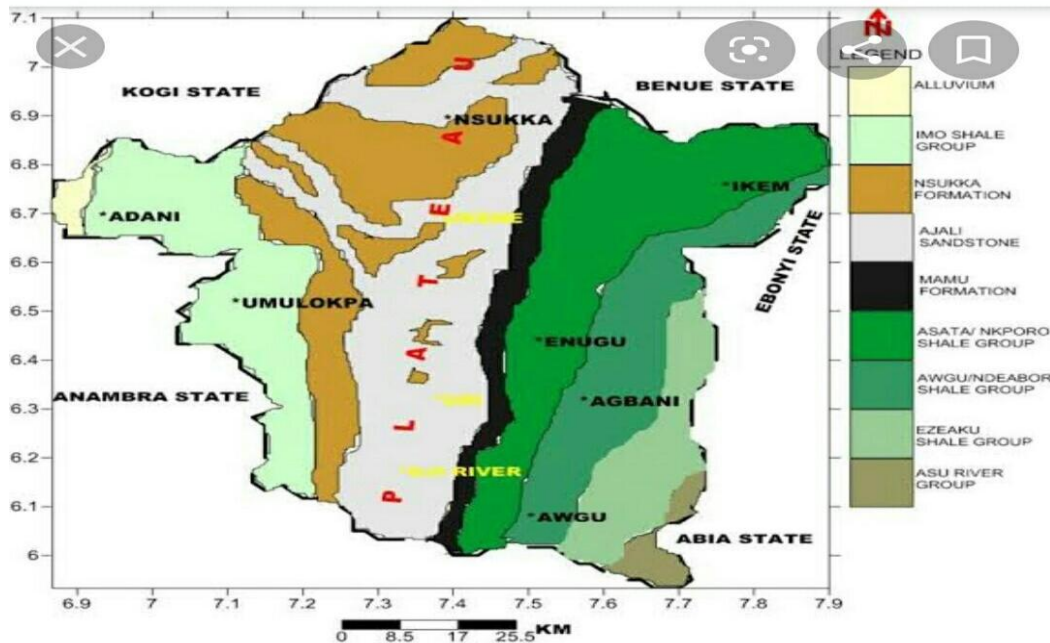


Figure 22: Geological Composition.

Topography:

Enugu lies at the foot of an escarpment and not a hill. Enugu is located in the cross river basin and the Benue trough and has the best developed coal in this Area.

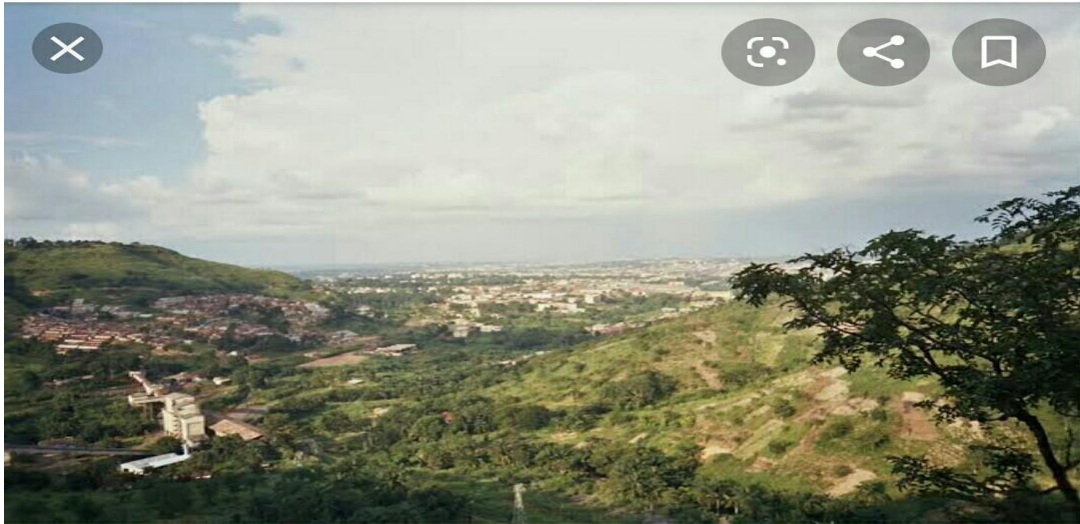


Figure 23: Topography of Enugu from Ngwo Hills

3.4 Site Selection Criteria

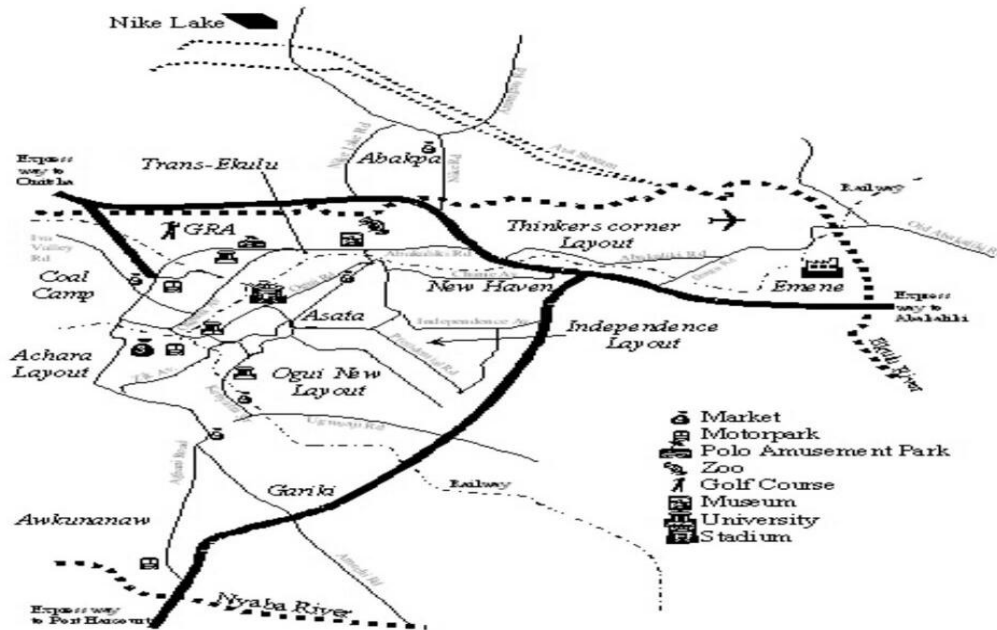


Figure 24: Enugu Metropolis

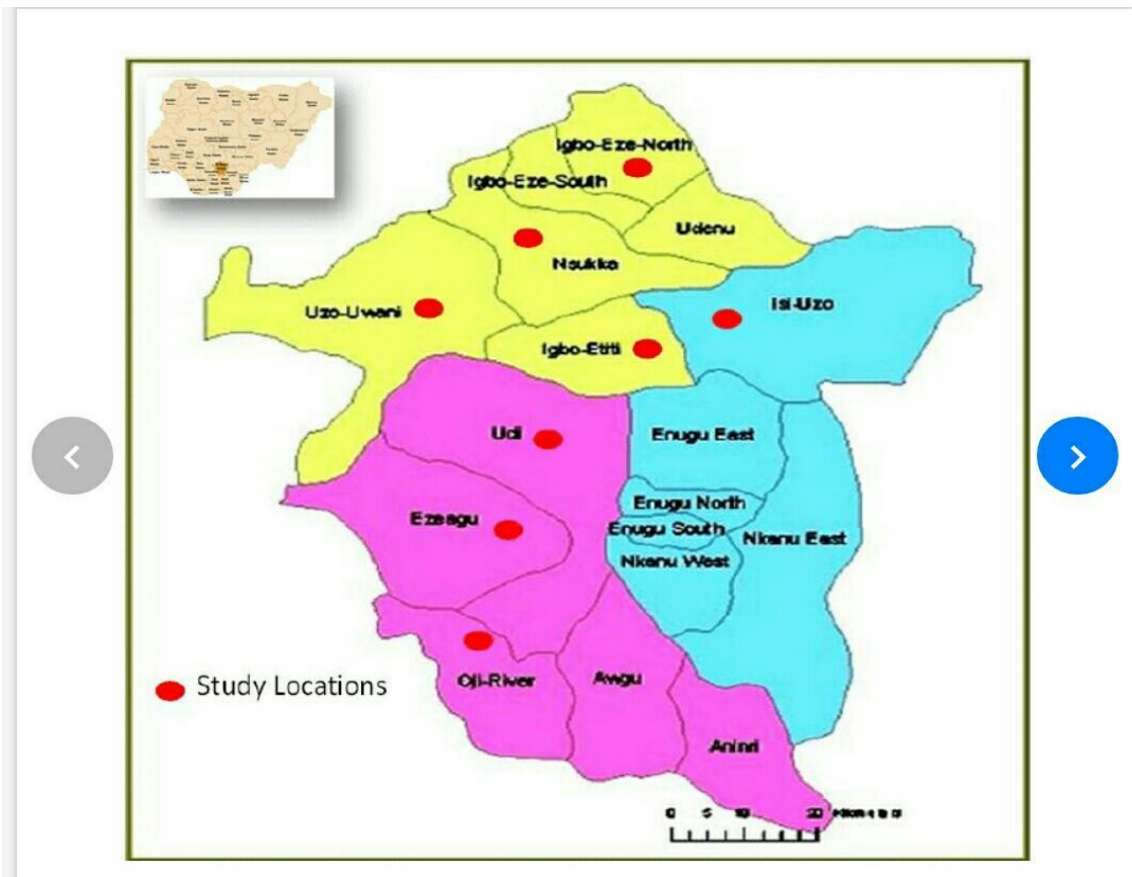


Figure 25: Map of Enugu.

Reasons for the site selection:

The site is located at 65 Abakiliki Road, Ogui junction GRA [Blueberries park], Enugu. Enugu North.

A Very Safe Location:

1. It is open and located at one of the central eye in Enugu state
2. It has a good soil nature
3. The site is more or less rectangular in nature, definitely it is much easier to organise rectangular space for easier supervision
4. Site considerations:
5. The site is relatively not flat and presently not cultivated. The soil offers sufficient bearing capacity for building.

Accessibility:

Vehicular and pedestrian access into the site is possible at street level from the roads adjoining the site. It is best to provide vehicular access separated from pedestrian access.

Drainage:

The site by virtue of being relatively not flat will require the careful construction of drainage systems. This will be channeled in the desired direction away from the site into the public sewer or central drainage system.

IV. DATA PRESENTATION AND ANALYSIS

A number of 300 copies of the questionnaires (as shown above) were distributed to some roadside vendors, and library users with some of the library staff both men and women. 200 out of the 300 questionnaires were returned. Below are results of data collected through the questionnaires:

	QUESTIONS	YES	NO	DON'T KNOW	TOTAL
1	Are there any State Library?	120	50	30	200
2	If yes, are they up to standard or do they lack important facilities?	45	135	20	200
3	If not, do you think there is a need for a standard State Library?	140	45	15	200

Table 1: Showing data presentation

Source: Author, 2019

DATA ANALYSIS

The information gathered through the questionnaire is duly analyzed through the use of bar charts below:

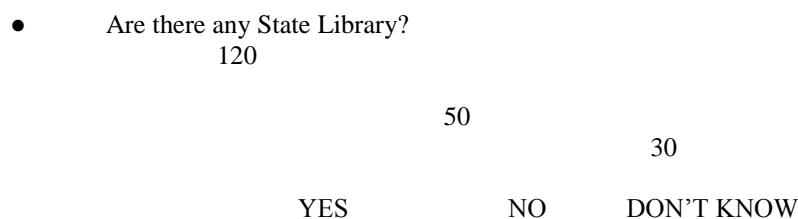


Fig. 26: Showing data presentation

Source: Author, 2019

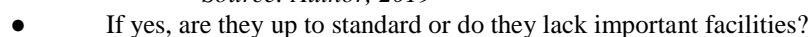


Fig 27: Showing data presentation

Source: Author, 2019

If not, do you think there is a need for a standard state library?

Fig 28: Showing data presentation

Source: Author, 2019

Percentage representation of peoples' opinion on the need for a Library in Enugu

$$\frac{140}{200} \times \frac{100}{1} = 70\%$$

$$\frac{45}{200} \times \frac{100}{1} = 22.5\%$$

$$\frac{15}{200} \times \frac{100}{1} = 7.5\%$$

$$\frac{50}{200} \times \frac{100}{1} = 0.05\%$$

From the analysis of the data collected, as shown above, it is an obvious fact that there is a need for a State Library in Enugu.

4.2.0 DESIGN PROPOSAL AND CONCEPT

The design proposal or brief is to produce a befitting facility for the proposed State Library, located at 65 Abakaliki Road, Ogui junction GRA [Newberries park], Enugu North, Enugu. The facility will not serve as a storage house of knowledge, but also as a center for enlightenment of the society.

The design brief and space requirements will be presented in a table form, showing the respective spaces, their capacities, the standards and the quantitative calculations of gross area.

SUMMARY OF SPACE

With reference to the standards and the planning facts and figure above, the space program has been worked out as follows:

FACILITY	AREA (M2)	REMARKS
PUBLIC		
Entrance Hall	150	Including the loan counter and inquiry desk.
Serial Section	165	Including a story room.
Children's Library	695	
Adult Lending Section	1845	
Adult Reference Section	1845	Including seating, shelving and stack.
Disabled Section	290	
Africana	150	
Virtual Library	180	Including projector and screens.
Kitchenette	200	Including stores.
Digital Library	1103	Including computer units.
Special Collections	220	
Bookshop	160	Including storage
Conveniences	35	60% of the total population at 20 persons to a W.C.
STAFF		
Loading and Unloading Bay	110	For 2 vans
Acquisition Unit	40	
Cataloging	80	
Bindery	110	
Sorting Room	100	
Training section	695	
Skill Acquisition center	695	
Maintenance Staff	40	
Standby Generator	30	
ADMINISTRATION		
Librarian	60	
Secretary waiting room		
Director's Office	32	Including convenience
Deputy Director's Office		Including convenience

Secretary to the Director	30	For each of the division
Account Office		
Public Relationship Department	20	
Staff General Office	70	
Board Room	35	

Table 2: Showing the respective spaces, their capacities and areas

Source: Author, 2019

It is important to point out that the above tabulated areas and sizes of space are approximate values based on recommended standards. They are thus subject to plus (+) and (-) variation in the progress of the actual design.

4.3.0 REQUIREMENT OF VARIOUS UNITS/ PLANNING DATA

Planning data involves the provision of enough spaces for those things necessary for each unit to function well and effectively. In determining these, the following are taking into cognizance:

- Spaces required for people in the library
- The number of vehicles that are meant to be parked at the peak period.
- Circulation pattern and space.
- The services rendered in each enclosed spaces and number of workers
- The type/size of openings
- Spaces: The spaces provided must accommodate all the facilities and fulfill its purpose of being created.

Above all the building has to be durable and consolidated. The visual interest is also not to be overlooked and the facades have to respect the streetscape.

Thus, the spaces required are broadly categorized as follows: Public areas, semi-public areas and private areas these are discussed below.

4.3.1 PUBLIC AREAS

The definition of a ‘public space’ is understood as “a space that is freely accessible for everyone” (Hajer 2000 p. 11). This definition is very broad, and to understand the importance of public space the definitions of ‘public domains’ and ‘open/single minded spaces’ are used to examine which space is available. The space allotted here is usually determined by the number of users, the purpose it serves. Sequel to this, adequate spaces should be provided for the following:

Reception Hall, Reading Sections like the Lending Section, the reading hall, the E – Library, the Children Section and the Conveniences

4.3.2 SEMI- PUBLIC AREA

These units basically constitute civic spaces and also are partially but not entirely open to the use of the public. Therefore, the spaces required here are for the following; Administrative Offices, and Stores.

4.3.3 PRIVATE AREAS

These regions are accessed by individuals or persons who are solely employees in the Library designated at some of those areas. E.g. services area and some offices.

4.4 SCHEDULE OF ACCOMMODATION

SCHEDULE OF ACCOMMODATION: The following categories were observed in the site planning process:

4.4.1 THE FACILITY

- Reading Sections
- Service areas (control rooms, Utility storage/maintenance/technical unit, etc.)
- Other commercial uses (head offices, recreational, etc.)
- Public uses, civic and social facilities (Conference Hall, children play area, etc.)

4.4.2 PEDESTRIAN AREAS

- Reading section, courtyards, walk ways, sidewalks and reception / exhibition.

4.4.3 AUTOMOBILE MOVEMENT AND PARKING AREAS

- **The public and staff;** surface parking and Lay-bys. Parking for staff, and individuals visiting the library.

4.4.4 BUFFER AREAS

- Landscaped areas separating car storage areas from the public road system.
- Landscaped areas separating parking areas from one another.
- Landscaped areas separating parking areas from service areas.

4.4.5 RESERVED AREAS

- Area allotted for future development

4.5 SPECIAL CONSIDERATIONS

The materials and finishes chosen for the design and construction of the State Library should be easily adaptable to pervasive trends both now and in the future. The materials should be inviting to the library users and should ultimately add beauty to the entire environment. There is also room for innovations. While meeting the following criteria:

4.5.1 FACTORS OF SPECIAL INTEREST

- Accessibility of the site
- Circulation in the site
- Building orientation
- Set-back
- Landscape
- Zoning
- Parking space

Accessibility of the site: The first consideration in any site development is the planning of the access to the site. The access should be clearly defined to avoid spelt out, Likewise the pedestrian access. Provision should be made for vehicular and pedestrian access. The accessibility of materials or goods would be considered which can be created for the media truck, railroad and convey belts. It is also envisaged that the provision of public and semi-public transportation is of utmost importance. To this end, there is the need to provide a functional separation of the various media of accessibility for each other.

Circulation in the site: Circulation spaces should be put into consideration and planned for so that there will be free flow of people and vehicles on the site.

Building orientation: The orientation is very important; the building has to be oriented in such a way that the shorter side of the building should fore the sun path and it should be positioned to enhance natural ventilation and due respect should be given to noise and sound control in external and internal environment.

Set-back: Set back is certain standard guiding planning for instance, the setbacks from the road to the site should not be too small or narrow, also avoid sharp bending into the site, as this will lead to traffic problems. It is also important to have a reasonable set back from the boundary of the site to the building.

Landscape: Landscape adds aesthetics to the design and makes it visually and emotionally satisfying. Some people appraise the design without considering the functionality. More than anything else it is seen that proper landscaping especially in the exterior, is another way of reaching the library users gaining their acceptance and goodwill.

Zoning: This involves the arrangement of similar activities in an area. Other reasons for zoning are facilities efficiency in providing public services and promoting facilities and public investments in pathways.

Parking space: The parking space is another element of any design, which is very important and should be given considerations during planning the parking space of the tenant, and should be differentiated from the library users to avoid traffic congestion during peak periods. To enhance good circulation, the parking space should be signified and clearly defined.

4.6 DESIGN CONSIDERATION

4.6.1 VENTILATION

Air flow in the interior of buildings may be created by allowing natural ventilation or by the use of artificial mechanical ventilation or air conditioning.

The production of buildings using more than one of these options is becoming more frequent. Such buildings are said to be 'Mixed-mode'. The overriding principle should be to minimize the need for artificial climate systems and one way to achieve this is to make maximum use of natural ventilation in conjunction with climate sensitive design techniques for the building fabric. Natural ventilation is possible due to the fact that warm air is lighter than cold air and therefore will tend to rise in relation to cold air. As it rises, colder air is drawn in to compensate: the buoyancy principle.

If air flow is to be encouraged to help provide natural ventilation and cooling the following are desirable design features: Plan form should be shallow to allow for the possibility of cross ventilation.

The most straightforward system of cross flow ventilation is where fresh air is provided with routes through a building from the windward to leeward side. In most office situations this can be considered as a supplement to the main ventilation strategy. Openings on opposite walls to allow cross-ventilation are better than on one or more adjacent walls.

Building depth should not be more than about five times the floor to ceiling height if cross-ventilation is to be successful.

For single sided ventilation, depth should be limited to about two and a half times the floor to ceiling height. Minimum opening areas should be about 5 percent of floor area to provide sufficient flow.

Continuous, secure background ventilation should be available using trickle vents and other devices.

Windows should be open-able, but able to provide *controlled* air flow. This is particularly difficult in high rise buildings but its problems have been addressed in the 40 storey Swiss Re building in the City of London.

The effectiveness of natural ventilation and cooling can be improved by the use of low energy controlled lighting and low energy office equipment, thus reducing internal heat gain. (Joseph & John, 1987).

4.6.2 MECHANICALLY ASSISTED VENTILATION

Rotating cowls was the system adopted by Michael Hopkins and Partners with Ove Arup and Partners in the Nottingham University Jubilee Campus. This ventilation system is the successor to Hopkins' and Arup's innovations at the Inland Revenue HQ also in Nottingham, and Portcullis House, Westminster. These led to a low pressure mechanical system linked to heat recovery via a thermal wheel which recovers 84 percent of the exhaust heat. In most commercial and institutional buildings it is unlikely that natural ventilation on its own will be adequate. A degree of mechanical assistance is necessary to achieve an adequate rate of movement around the building. Mechanical assistance should not be confused with air conditioning which is a much more complex operation. (Joseph & John, 1987).

Mechanical ventilation involves air flow and movement provision using fans and air and possibly supply/extract ducts. Such a system may be able to act as the heating system in winter. However, in its basic form, no cooling system is incorporated and therefore the lowest air temperature which can be supplied is usually restricted to ambient conditions. Air conditioning involves the cooling of the air using a refrigeration system. More precise control over air temperature and humidity can be achieved this way but usually only within a sealed building. In many temperate climates, the thermal inertia of a building structure, combined with controlled air flow, should be sufficient to avoid excessive overheating except for a few hours each year. Immediately air conditioning is specified, energy use is likely to increase substantially.

As mentioned the inclusion of mechanical reinforcement of natural ventilation is the first step in the mixed mode direction. There are at least four types of mixed-mode ventilation:

- *Contingency* – mechanical ventilation is added or subtracted from the system as necessary.
- *Zoned* – different ventilation systems are provided for different portions of the building depending upon needs.
- *Concurrent* – natural and mechanical systems operate together.
- *Changeover* – natural and mechanical systems operate as alternatives (but often turn out to be concurrent because of difficulties in zoning or changeover point control).

Naturally, proper ventilation is achieved by good orientation of the building and provision of sufficient fenestration, such as doors, windows. As a public building the library should ensure adequate air circulation within it. Artificial ventilation such as electric fans, air conditioners would also be used to supplement natural ventilation. However, the use of such artificial ventilation is to be the minimum that is when it is necessary. (Joseph & John, 1987).

4.6.3 LIGHTING

Lighting is of great importance in designs of Library projects. As one of the largest energy sinks for commercial and industrial buildings, lighting justifies special treatment.

Furthermore, with buildings becoming increasingly energy efficient in terms of space heating so the lighting load becomes of greater significance. It will be some time before we realize the revolution in lighting promised by developments in light emitting diodes. Current wisdom has it that Library design should optimize natural lighting.

One reason for this is that lighting is often the largest single item of energy cost, particularly in open plan libraries. Another factor is that people reading in the library tend to prefer natural light, especially since certain forms of artificial lighting have been implicated as the source of health problems. (Joseph & John, 1987).

Energy efficient buildings should make as much beneficial use of naturally available light as possible. Lighting is important because of the influence it has over occupant experience. Until about 50 years ago, the use of windows and plan form of buildings was very much influenced by the limits of natural light admission. The development of the fluorescent tube lamp made the deep plan office a feasible proposition but at the expense of noise pollution and frequency band discomfort.

There was the added psychological penalty of reducing access to daylight and external views. It is only relatively recently that the importance of these benefits has been acknowledged.

Principal factors influencing levels of daylight are:

- Orientation of windows;
- Angle of tilt of windows;
- Obstructions to light admission (e.g. nearby buildings); reflectivity of surrounding surfaces.

Factors which relate to the exploitation of daylight include:

- Windows provide external views and time orientation for users.
 - Library users are more accepting of variable illumination when daylight is the light source.
- Natural light produces a true color rendering. However, it would be unusual to expect to supply all lighting requirements using daylight in non-domestic buildings. (*Joseph & John, 1987*). In order to achieve successful day lighting design, the following aspects should be considered:
- The amount of glazing has a clear influence on the amount of daylight available, but more window area is not always better, it may simply increase contrast.
 - Large windows admit light but also provide heat gain and heat loss routes and thus potential thermal discomfort, especially from cold draughts near the windows.
 - The amount of sky which can be seen from the interior is a critical factor in determining satisfactory day lighting.
 - High window heads permit higher lighting input as more sky is visible.
 - External obstructions/buildings which subtend an angle of less than 25 percent to the horizontal will not usually exclude use of natural daylight.

METHODS OF LIGHTING

Two basic methods of lighting will be used in this design. These include:

- Natural lighting
- Artificial lighting

NATURAL LIGHTING

Natural lighting is the skillful application of day lighting techniques. It is best achieved by orientation of the building to the sunrise (East) of the building and its sunset (West) sheets of colored glass would be blended with clear glass to enhance the lighting effect and enrich the interior.

ARTIFICIAL LIGHTING:

Artificial lighting would be provided mainly for the purpose of aesthetics. Artificial lighting installations would be evenly distributed.

4.6.4 FIRE AND LIGHTING CONTROL

FIRE

This can be caused by any of the following;

- Faulty or overworked mechanical and electrical gadgets.
- Accident from heating and cooking utensils.
- Explosions from wrongly designed electrical and mechanical services.

Fire can be prevented in the following ways;

- By planning the location of the sources of fire in relation to the means of escape.
- The use of fire resisting materials for both structural and other parts of the building to increase the fire rating.
- Provision of adequate spaces around the building to allow free movement of fire Engineers.

4.6.5 SOLAR RADIATION:

Radiation heat emitted from the sun can be a source of irritation, be it direct or reflected. It can however be controlled by

- Landscaping
- Use of roof overhang
- Recessing the doors and window openings
- The use of solar shading devices like screen blinds, louvers.

4.6.6 THERMAL INSULATION

The building would be thermally insulated so that a comfortable cool temperature level is maintained inside. This would reduce electricity consumption and ultimately a reduction in the annual running cost. These must be treated to ensure minimum heat gain to maintain comfortable condition. Some thermal insulating materials are expanded polystyrene, foamed polyurethane, chipboard, roofing felt, expanded plastic and plaster board.

4.7 CONSTRUCTION TECHNIQUES

4.7.1 CONSTRUCTION MATERIALS

All construction materials should withstand the weather conditions adequately. They should not require excessive maintenance and should be economical in use. Construction failure should be avoided by careful detailing, good construction, and adequate supervision of the work.

STRUCTURAL WALL

The material for the structural walls includes sandcrete blocks, stones, reinforced concrete columns and beams.

- Concrete: This requires surface treatment otherwise; it will require extensive maintenance in 25 year. Good control is needed over mixes and water content. Concrete covers shall be plaster, gypsum, thin stone slabs.

ROOFING: Lattice trusses, steel, or timber shall be used as roofing trusses for the building depending on the span.

ROOF COVERINGS: corrugated aluminum sheets shall be used for roof coverings as they are lightweight.

FLOORS: The floor shall be concrete slab terrazzo.

DOORS: Aluminum doors, flush doors, carved wooden doors.

WINDOWS: Glass with aluminum frames, with a burglary proof material like stainless steel welded wire mesh – to prevent the loss of material from the library.

FINISHES: The choice of finishes would depend on the client’s decisions. The following materials are available and recommended.

- Internal walls - plaster, screed and paint, wallpaper
- External walls - plaster, paints and fair faced concrete.
- Ceiling - Asbestos, luxatos, pop and acoustics ceiling tiles
- Floors - marble, p.v.c tiles and cement screed

V. CONCLUSION

The Need for a Library

The high level of educational degradation experienced today must be improved. This has been achieved by the design of a good study area and culture centers, so as to inculcate knowledge and make learning mobile.

The modern world has created an easier and faster means of providing data, which is opened to all sex, age, race, colour, region, language, status and nationality; it has also been made conducive for the display of all necessary information, which aids in protecting the culture of our society, and preserving our culture as well.

Finally, the environment, the platform has been created so that all readers utilize the facilities provided. As the wise man would say “KNOWLEDGE IS POWER”. Let all users

5.2 RECOMMENDATION

The following recommendations are given for a successful implementation of this thesis proposal. The Library is sufficient to work at maximal utility and cannot be used outside its functionality, the library is adequate to work at the peak period and off period.

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