



NBRRI NEWSLETTER

Special Edition

**THE NIGERIAN BUILDING AND
ROAD RESEARCH INSTITUTE**

2023 SCORECARD





NIGERIAN BUILDING AND ROAD RESEARCH INSTITUTE
(FEDERAL MINISTRY OF INNOVATION, SCIENCE AND TECHNOLOGY)



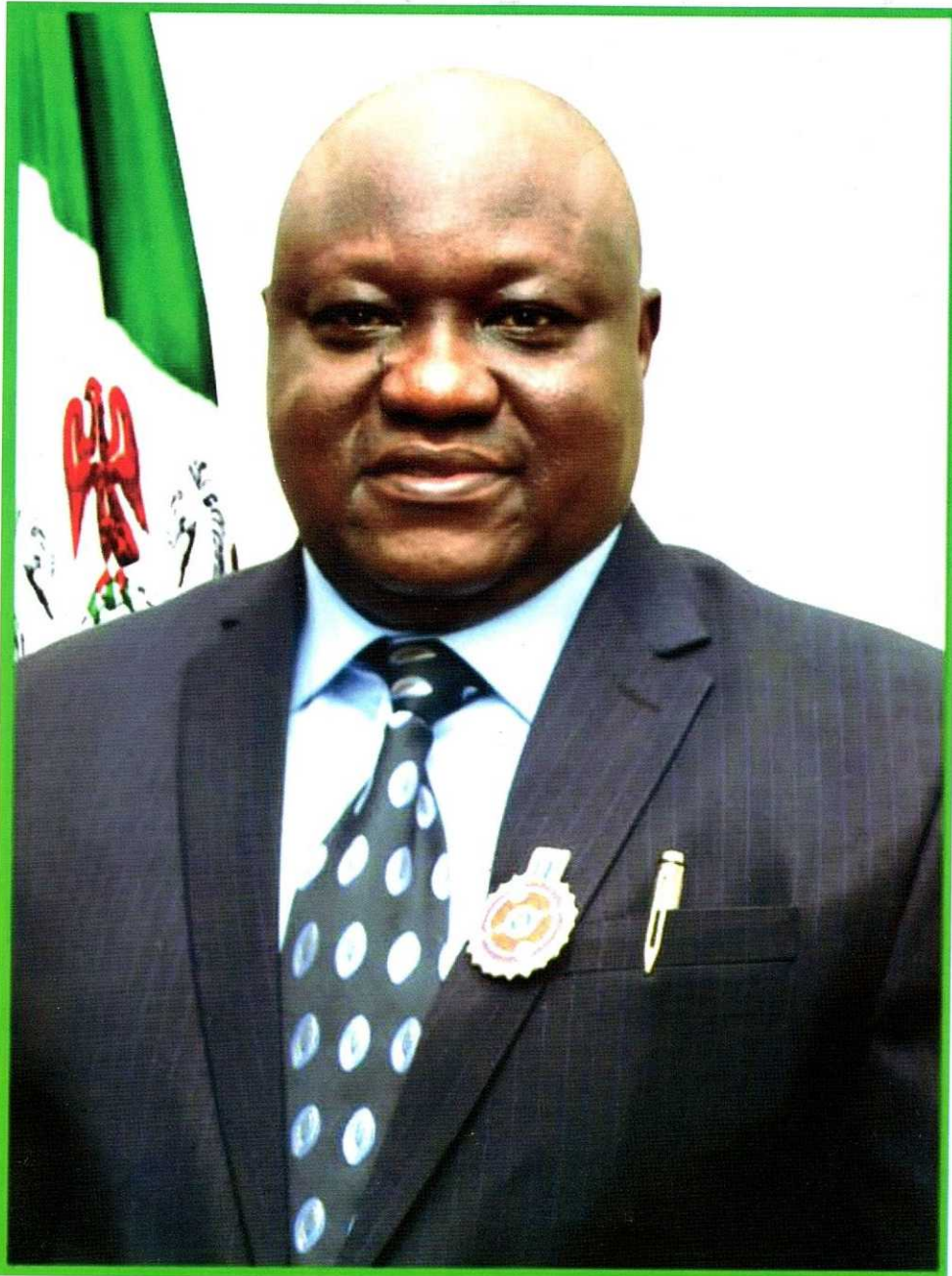
HIS EXCELLENCY
BOLA AHMED TINUBU GCFR
PRESIDENT, COMMANDER-IN-CHIEF OF THE ARMED FORCES
FEDERAL, REPUBLIC OF NIGERIA



CHIEF UCHE GEOFFREY NNAJI
HONOURABLE MINISTER
FEDERAL MINISTRY OF INNOVATION, SCIENCE AND TECHNOLOGY



ESUABANA NKO-ASANYE
PERMANENT SECRETARY
FEDERAL MINISTRY OF INNOVATION, SCIENCE AND TECHNOLOGY



PROF. SAMSON DUNA, MNIEM, RE(coren), FNICE, FNSE
DIRECTOR-GENERAL/CHIEF EXECUTIVE OFFICER
NIGERIAN BUILDING AND ROAD RESEARCH INSTITUTE (NBRRI).

1. INTRODUCTION

The Nigerian Building and Road Research Institute (NBRRI) is a research institution in Nigeria that is dedicated to advancing knowledge, technology, and innovation in the fields of construction, building, and road infrastructure.

Established in 1978, NBRRI operates under the Federal Ministry of Innovation, Science and Technology and plays a crucial role in the development and improvement of Nigeria's construction and transportation sectors.

The Institute was set up to conduct integrated applied research and development into the varied aspects of the economy's building, road, and construction sectors.

Several significant achievements were recorded in the last few years. These achievements were in the areas of new innovations, upgrading some existing NBRRI innovations, evolving and embarking on new R&D projects, embarking on aggressive outreach/extension programs, administration activities, etc.

The ACT setting up NBBRI allowed them to conduct research and development within a given mandate



VISION

To evolve and use a comprehensive and integrated approach in capacity building and investment promotion so as to foster the application of environment friendly and energy efficient innovation, construction materials, manufacturing technologies and cost effective building and road construction practices, which will enhance job creation, wealth generation and poverty reduction as well as nurture the emergence of vibrant, knowledge based and highly competitive indigenous construction companies capable of meeting global standards.

MANDATE

- I. Local building and construction materials to determine the most effective and economic methods of their utilization
- II. Architectural Design of buildings to suit Nigerian climatic conditions with respect to lighting, ventilation, thermal comfort and humidity.
- III. The design and performance of functional units in buildings including electrical installations, plumbing, painting, drainage, ventilation and air conditioning system
- IV. Local construction, foundation and earth-works for buildings and bridges, especially on problem soils
- V. Local construction and building operations and methods to increase their effectiveness.
- VI. The design and construction of roads best suited to the Nigerian environment
- VII. The economic and social aspects of the building and construction industry.
- VIII Structural designs of buildings and bridges and the development of design criteria, specifications and codes of practice

In addition, the Institute provides:

- i. Consultancy services relating to building, Road and Engineering materials to individuals, public and private organizations.
- ii. Specialist support services to medium and small-scale enterprises in the areas of training, testing and evaluation of products, materials characterization, materials selection (specification), feasibility study, materials information services, enhancement of product quality and market potential.

MISSION

Integrate R & D, Capacity building and robust extension services in which technology innovation and knowledge based practices in the fields of building road and engineering materials will be used to provide adequate and affordable housing and road infrastructure as well as increased economic empowerment.

CORE VALUES

- Professionalism
- Resourcefulness
- Commitment and Integrity
- Innovativeness

NBRRI LOCATIONS.

NBRRI ADMINISTRATIVE HEADQUARTERS, LABORATORIES & TRAINING CENTRE

No.10, NBRRI Way/I.T. Igban Street, off Chief Obafemi Awolowo Way, Jabi, Abuja

NATIONAL LABORATORY COMPLEX & POZZOLANA PRODUCTION CENTRE

km 10, Idiroko Road, P.M.B 1055, Ota, Ogun State.

ZONAL OFFICES

SOUTH WEST:

15, Awolowo Road, Ikoyi
Okigwe Express way,
P.M.B 12568, Ikoyi
Lagos State

SOUTH EAST:

Plot 750, Nnewi Okigwe Express way,
P.M.B 5070, Nnewi,
Anambra State

NORTH CENTRAL:

No 2, Wase Road
GRA, Jos, Plateau State

SOUTH- SOUTH:

Plot 14, Ubi Inyang Street,
Akwa Housing Estate,
Off Abak Road, Uyo
Akwa Ibom State

NORTH WEST:

Plot 124, Block 5 Katsina Road
P.M.B 558, Kano, Kano State

NORTH EAST:

Sharo Road, New G.R.A
Opposite Conoil, Gombe
Gombe State

NBRRI WEBSITE ADDRESS: <https://www.nbrri.gov.ng>

CURRENT STAFF STRENGTH OF NBRRI .

The Institute currently have a total number of 464 Staff, which is broken down as follows: Research Officers: 190 Technical Staff : 81 Service Staff : 193 Over the years, the Institute has produced notable research and development results in the Building, Road and Engineering Materials areas for which the Institute is known.

ORGANIZATIONAL STRUCTURE.

NBRRI is a Category 'A' Parastatal, with a Governing Board, and headed by a Director -General who oversees the day-to day running of the agency, supervised by Federal Ministry of Innovation, Science and Technology. The Institute is made up of the following Departments.

- ◆ Building Research Department. ◆ Road Research Department.
- ◆ Engineering Materials Research Department.
- ◆ Science Laboratory Technology Research Department.
- ◆ Planning Information and Technology (PIT) Department.
- ◆ Consultancy and Extension Services (CES) Department.
- ◆ Finance and Account Department.
- ◆ Administration and Personnel Department.
- ◆ Procurement and Maintenance Department.
- ◆ Directorate of Inspectorate and Special Duties.

Research
Department

Service
Department.



PROF. SAMSON DUNA
DIRECTOR-GENERAL/CEO



Dr. C. C OSADEBE
Director, Road Research



Mrs JUDE ILOMA
Director, Admin and Personnel



Mr IGNATIUS N. ONWUSIRI
Director, Finance and Account



MR KEHINDE P. ARABI
Director, PIT



MR.MAKAVA DANIEL
Director, CES



Mr. AJAH A. BONIFACE
Director, I&SD



Dr. APEH I. FRIDAY
Head, Engineering Materials
Research Dept.



Dr. SULYMON N.
Head, Building Research Dept



Mr. OCHOLI M.
Head, Science Lab Tech.
Research Dept.



ENGR. ISAH S. DANTALA.
Head, Procurement

NUMBER OF CHANGES IN LOCAL DESIGN AND FABRICATION OF MACHINES AND EQUIPMENT

Over 13NO machines and software were designed and fabricated by NBRRI in 2023 using the reverse engineering process.

Reverse engineering (known as **backwards engineering**) is a process or method through which one attempts to understand through deductive reasoning how a previously made device, process, system or software accomplishes a task.

The process is specific to the object on which it is being performed, all reverse engineering processes consist of three basic steps: **information extraction, modeling, and review**

LIST OF LOCAL DESIGN AND FABRICATION OF MACHINES AND EQUIPMENTS MADE BY NBRRI IN 2023

1. DESIGN AND CONSTRUCTION OF A MINI EXCAVATOR
2. DESIGN AND FABRICATION OF INTERLOCKING SANDCRETE BLOCK MAKING MACHINE
3. DESIGN AND FABRICATION OF PARTICLEBOARD ROTARY DRYER
4. DESIGN AND FABRICATION OF NBRRI CONCRETE MIXER
5. DEVELOPMENT OF HEAVY-DUTY HYDRAULIC FORKLIFT MACHINE FOR BUILDING APPLICATION
6. DESIGN AND CONSTRUCTION OF EARTH COMPACTOR/ASPHALT CUTTING MACHINE (MODIFICATION)
7. EVALUATING THE VIABILITY OF SILICA SAND IN NASARAWA & BENUE STATES FOR THE PRODUCTION OF GLASS FOR CONSTRUCTION INDUSTRIES

LIST OF LOCAL DESIGN AND FABRICATION OF MACHINES AND EQUIPMENTS MADE BY NBRRI IN 2023

8. THE APPLICATION OF INTELLIGENT SENSORS TO MONITOR CONCRETE HARDENING
9. DEMONSTRATION PROJECT TO DEVELOP MODULAR TOILETS BASED ON POLYMER-BASED COMPOSITE MATERIAL
10. DEVELOPMENT AND APPLICATION OF AN INTELLIGENT TRAFFIC CONTROL SYSTEM
11. NBRRI LABORATORY INFORMATION MANAGEMENT SYSTEM (LIMS)
12. BUILDING AUTOMATION AS ENERGY EFFICIENCY SOLUTION
13. ENHANCING THE SAFETY OF WORKERS ON CONSTRUCTION SITES IN THE EVENT OF BUILDING COLLAPSE IN NIGERIA WITH THE IMPLEMENTATION OF REAL TIME LOCATORS (RTLs)

PATENTS REGISTERED IN 2023 IN NBRRI

One of the main functions of the patent system is to foster technological innovation by providing an incentive for research and development. The patent system also works to disseminate technical information and promote technology transfer

Patents protect inventions that are new, useful, and offer a significant improvement over what already exists.

PATENT CERTIFICATES OBTAINED IN 2023

Patent Certificates

1. NBRRI Semi-Automated Interlocking Block Making Machine (Diesel Driven)
2. NBRRI Semi-Automated Interlocking Block Making Machine (Electric Driven)

MEMORANDUM OF UNDERSTANDING (MOU) IN 2023

Memorandum of understanding with States under Universal Basic Education Board

Memorandum of understanding with Lead Star Intersarsity (Institute of Technology and Entrepreneurship Development)

Memorandum of understanding with Rolgard Integrated Projects (RIP)

TRANSFORMATION OF NBRRI OFFICES

NORTH WEST ZONAL OFFICE, KANO



Kano Old Office (Built by NBRRI)



Kano New Office (Built and own by NBRRI)

TRANSFORMATION OF NBRRI OFFICES

NORTH EAST ZONAL OFFICE, GOMBE



Gombe Old Office (Donated by Gombe State Government)



Gombe New Office (Built and own by NBRRI under construction)

TRANSFORMATION OF NBRRI OFFICES

SOUTH EAST ZONAL OFFICE, NNEWI



Nnewi Zonal Office undergoing renovation

TRANSFORMATION OF NBRRI OFFICES

SOUTH-SOUTH ZONAL OFFICE, UYO



Presently in search of land to build NBRRI Uyo Zonal Office

Provision of Mikano Generator and Solar Street Light

Uyo Zonal Office (Donated by State Government)

TRANSFORMATION OF NBRRI OFFICES

NBRRI LABORATORY COMPLEX, OTA.



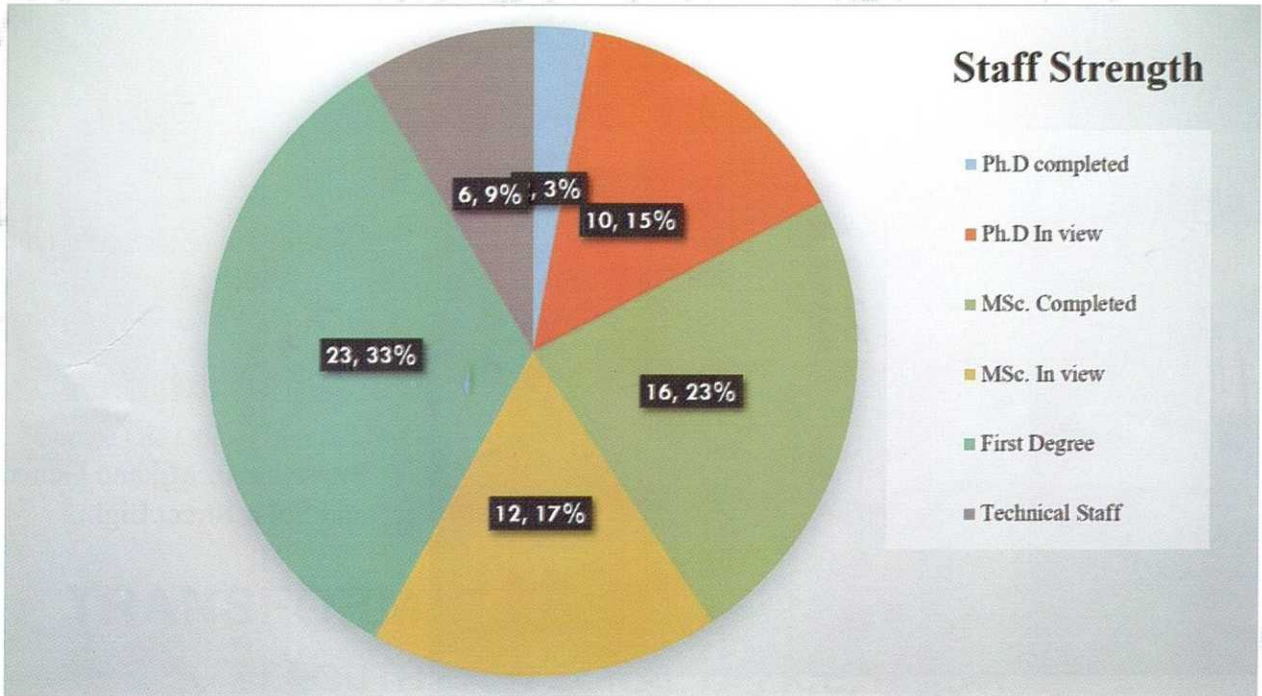
The ICT Building (Rare View)



The Workshop Bays

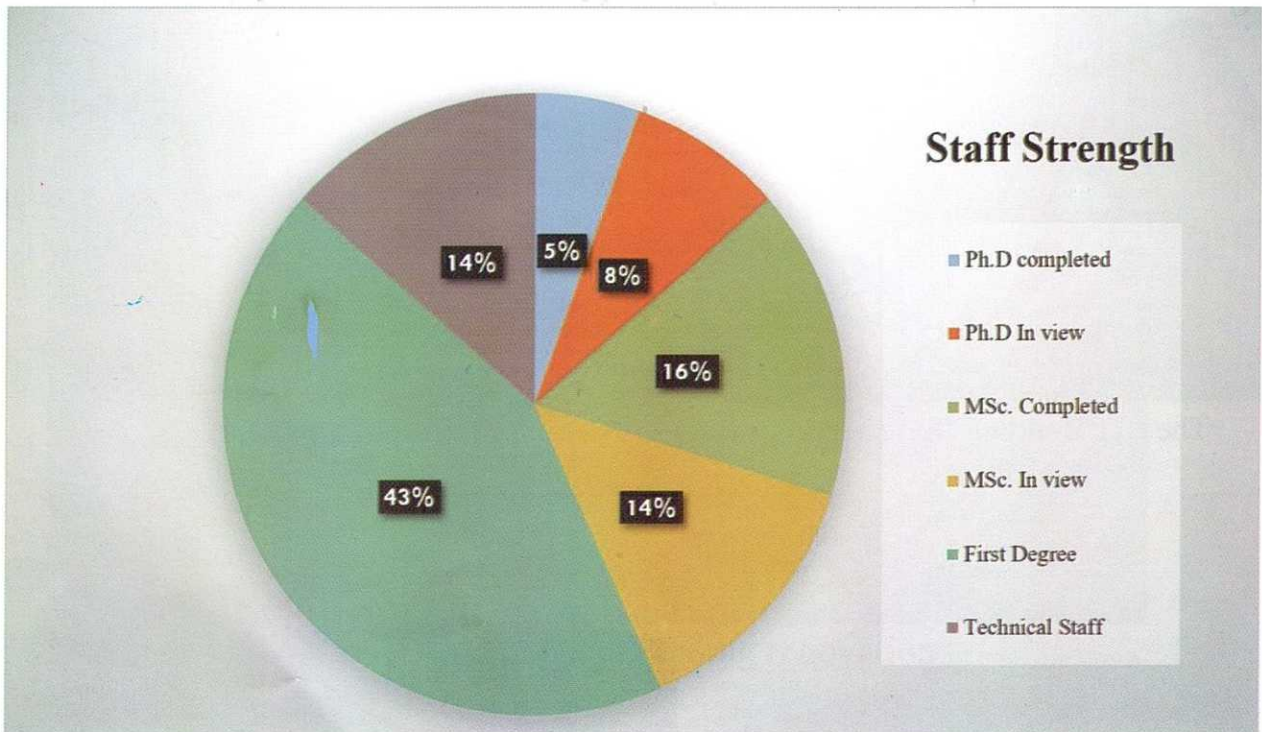
CAPACITY BUILDING

Building Research Department



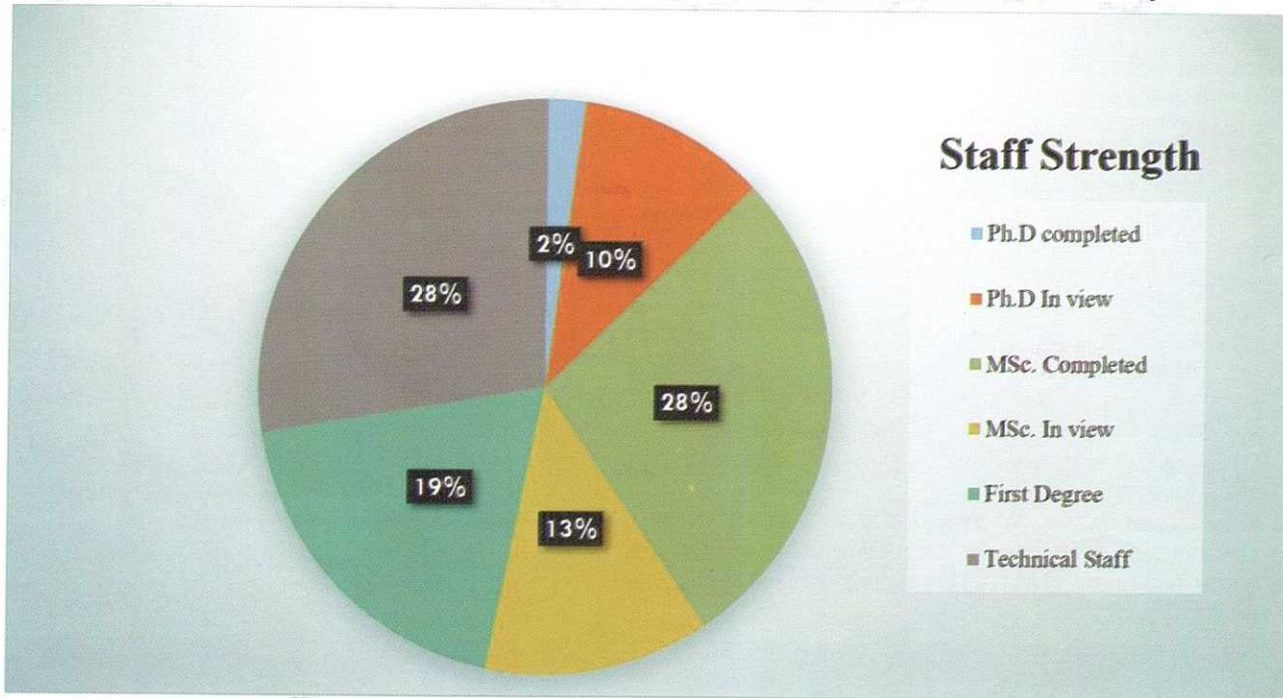
CAPACITY BUILDING

Road Research Department



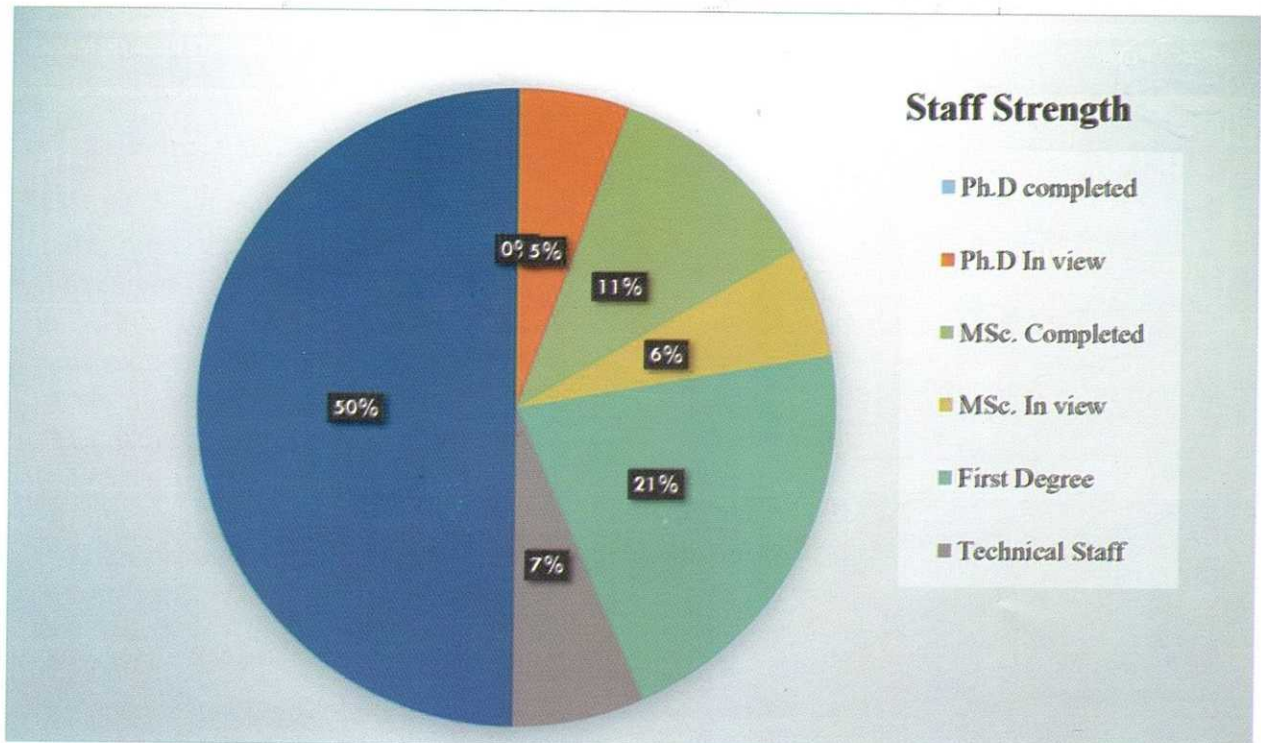
CAPACITY BUILDING

Engineering Material Research Department (EMRD)



CAPACITY BUILDING

SCIENCE LABORATORY AND TECHNOLOGY RESEARCH DEPARTMENT



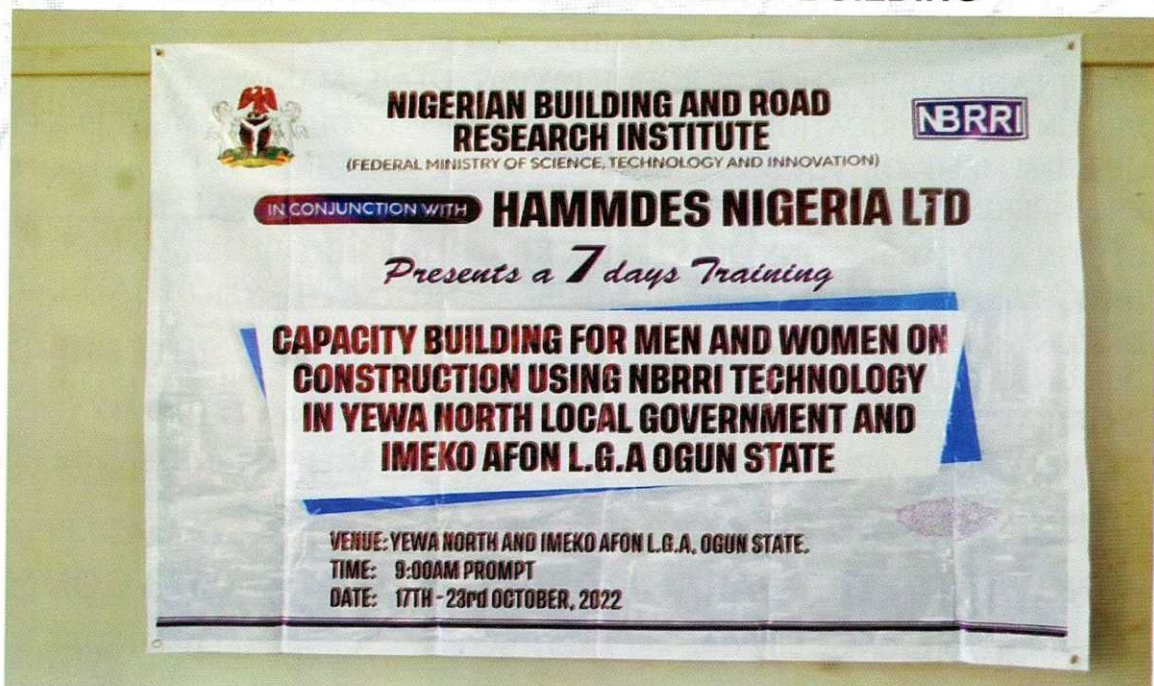
CAPACITY BUILDING IN 2023

S/ NO	DESCRIPTION	NO. OF PARTICIPANTS	TRAINING LOCATION	MANDATE AREA /REMARKS
1	TRAINING OF LIFE-ND O&M TEAM ON SUSTAINABLE RURAL ROADS OPERATIONS AND MAINTENANCE (O&M)	18	OTA, OGUN STATE	ROADS
2	TRAINING OF YOUTHS AND ARTISANS IN YEWA NORTH/ IMEKO- AFON FEDERAL CONSTITUENCY, OGUN STATE IN THE USE AND APPLICATION OF ALTERNATIVE INDIGENOUS TECHNOLOGIES FOR AFFORDABLE HOUSING AND CONSTRUCTION NAMELY CONCRETE; MASONARY; IRON BENDING; PLUMBING; TILING AND STONEMWORK; CARPENTARY AND JOINERY; PAINTING AND DECORATION; AND CONSTRUCTION SAFETY	50	IMEKO- AFON, OGUN STATE	BUILDING
3	CAPACITY BUILDING FOR MEN AND WOMEN ON CONSTRUCTION TECHNIQUES USING NBRRI TECHNOLOGY IN YEWA NORTH LOCAL GOVERNMENT AREA AND IMEKO-AFON LOCAL GOVERNMENT AREA, OGUN STATE.	100	IMEKO- AFON, OGUN STATE	BUILDING AND ROAD
4	SKILL ACQUISITION TRAINING ON REHABILITATION AND CONSTRUCTION OF ROADS USING LOCAL MATERIALS FOR YOUTH IN ANAMBRA NORTH SENATORIAL DISTRICT, ANAMBRA STATE	300	OGBARU, ANAMBRA STATE	ROAD
5	SENSITIZATION AND EMPOWERMENT OF YOUTHS ON MOTORCYCLES IN AKWA IBOM NORTH WEST SENATORIAL DISTRICT	60	AKWA IBOM	ROAD SAFETY

CAPACITY BUILDING IN 2023

S/NO	DESCRIPTION	NO. OF PARTICIPANTS	TRAINING LOCATION	MANDATE AREA /REMARKS
6	CAPACITY BUILDING AND SKILL ACQUISITION TRAINING ON MASONRY, PLUMBING AND PIPEFITTING, SURVEYING AND ELECTRICALS FOR YOUTH IN ASARI-TORU / AKUKU-TORU FEDERAL CONSTITUENCY RIVERS STATE.	100	ASARI-TORU RIVERS STATE.	BUILDING AND ROAD (SURVEY)
7	TRAINING AND EMPOWERMENT FOR THE YOUTHS AND WOMEN ON MASONRY, TILING, PAINTING AND INTERIOR DECORATION IN MASARI KAFUR L.G.A KATSINA STATE	60	MASARI, KAFUR L.G.A KATSINA STATE	BUILDING
8	FABRICATION OF 10NOS NBBRI MACHINES AND FOR DEMONSTRATION AT IKOT NDUDOT, ONNA LGA AKWA IBOM STATE	50	IKOT NDUDOT, ONNA LGA AKWA IBOM STATE	BUILDING AND ENGINEERING MATERIALS (FABRICATION)
9	GRANT EMPOWERMENT FOR WIDOWS AND PETTY TRADERS IN SOME AREAS OF OYO STATE	200	IBADAN, OYO STATE	BUILDING (MASONRY TOOLS)

SAMPLE BANNER OF CAPACITY BUILDING



PICTURES FROM CAPACITY BUILDING



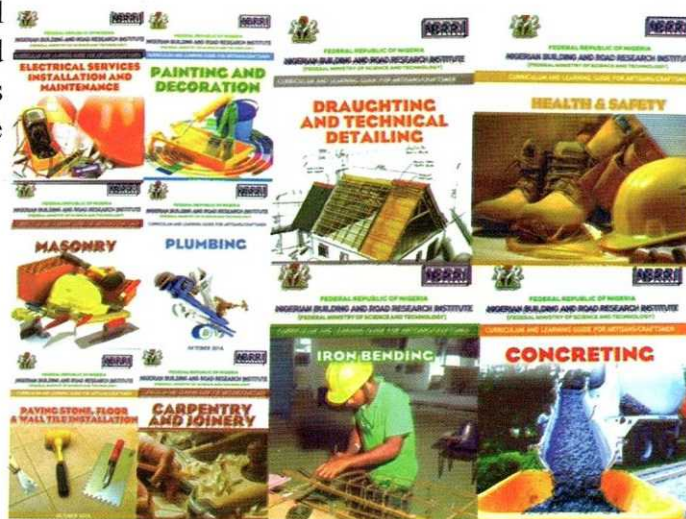
CAPACITY BUILDING

Curriculum Development For Artisans In Construction Industry

NBRRI developed a robust, practical and relevant competency based curriculum for the training of artisans in 10 selected trades in the construction industry;

- ◆ Masonry,
- ◆ Carpentry,
- ◆ Electrical installation,
- ◆ Plumbing and fittings,
- ◆ Floor finishes,
- ◆ Iron bending,
- ◆ Painting and decoration
- ◆ Draughting
- ◆ Concrete and reinforcement.
- ◆ Health and Safety

Competency-based



Learning Guides for Ten (10) Trades in the Building Construction Industry

INNOVATION, RESEARCH & DEVELOPMENT IN 2023

1. DESIGN AND CONSTRUCTION OF A MINI EXCAVATOR
2. DESIGN AND FABRICATION OF ROUGH PAVING STONE MAKING MACHINE
3. DESIGN AND FABRICATION OF BLOWER FOR THE POZZOLANA CEMENT PLANT
4. DEVELOPMENT OF PORTABLE SAND-BLASTING MACHINE FOR USE IN ENGINEERING CONSTRUCTION INDUSTRY
5. DESIGN AND FABRICATION OF INTERLOCKING SANDCRETE BLOCK MAKING MACHINE
6. DESIGN AND FABRICATION OF PARTICLEBOARD ROTARY DRYER
7. DESIGN AND FABRICATION OF MINI LABORATORY BALL MILL
8. DESIGN AND FABRICATION OF NBRRI CONCRETE MIXER
9. FABRICATION OF A HYDRAULIC HOSE CRIMPING MACHINE
10. DEVELOPMENT OF HEAVY-DUTY HYDRAULIC FORKLIFT MACHINE FOR BUILDING APPLICATION

INNOVATION, RESEARCH & DEVELOPMENT IN 2023 CONTD

10. DESIGN AND CONSTRUCTION OF EARTH COMPACTOR/ASPHALT CUTTING MACHINE (MODIFICATION)
11. DEVELOPMENT OF NBRRI PAINT USING LOCAL CONTENT
12. AGRO FIBER PROCESSING FOR THE PRODUCTION OF POP CEILING BOARD
13. ASSESSMENT OF ELECTROMAGNETIC RADIATION DUE TO GSM MASTS AND THEIR HEALTH EFFECTS ON BUILDING RESIDENTS: CASE STUDY OF LAGOS STATE
14. INVESTIGATION INTO THE EFFECT OF VEHICLE EMISSIONS ON THE SAFETY OF THE POPULACE AROUND URBAN ROADWAYS IN NIGERIA: A CASE STUDY OF LAGOS STATE.
15. COMPARATIVE ASSESSMENT OF NBRRI ROAD MONITOR AND ROAD LABPRO MOBILE APPLICATION FOR ROAD CONDITION MONITORING

NUMBERS OF INNOVATION, RESEARCH & DEVELOPMENT IN 2023

- 1) POTENTIAL OF BLENDED NBRRI POZZOLANA BINDER ON PAVEMENT FAILURE REDUCTION IN NIGERIA: A CASE STUDY OF SAGAMU-ORE-BENIN ROAD
- 2) EOTECHNICAL INVESTIGATION OF PROBLEMATIC SOILS IN NIGERIA FOR ECONOMIC FOUNDATION DESIGN: A CASE OF RIVERS STATE
- 3) HIGHWAY SOIL EROSION IN NIGERIA: A CASE STUDY OF SOUTH-WESTERN NIGERIA
- 4) GEOTECHNICAL STUDY OF LANDSCAPE SENSITIVITY IN OSUN AND ONDO STATES FOR SUSTAINABLE DEVELOPMENT
- 5) EVALUATING THE VIABILITY OF SILICA SAND IN NASARAWA/BENUE STATES FOR THE PRODUCTION OF GLASS TO THE CONSTRUCTION
- 6) MODELLING THE EFFECTS OF POPULATION GROWTH AND MATERIAL COSTS ON HOUSING DEMAND IN NIGERIA USING SYSTEM DYNAMICS APPROACH
- 7) ASSESSING THE QUALITY OF DIFFERENT BRANDS OF HOUSEHOLD ELECTRIC CABLE BRANDS IN NIGERIAN MARKETS

NUMBERS OF INNOVATION, RESEARCH & DEVELOPMENT IN 2023

- 8) LABORATORY INFORMATION MANAGEMENT SYSTEM (LIMS)
- 9) DESIGN AND DEVELOPMENT OF A REAL-TIME POTHOLE MONITORING AND ROAD DAMAGE DETECTION SYSTEM FOR NIGERIAN ROADS USING IMAGE CLASSIFICATION AND YOLO ALGORITHM
- 10) EVALUATING THE POTENTIALS OF NATURAL BITUMEN AS A BINDER FOR IMPROVING THE MECHANICAL AND PHYSICAL PROPERTIES OF WOOD PLASTIC COMPOSITES WALL PANELS.
- 11) ENHANCING THE SITE SAFETY OF CONSTRUCTION WORKERS THROUGH THE APPLICATION OF RADIO-FREQUENCY IDENTIFICATION IN THE EVENT OF BUILDING COLLAPSE IN NIGERIA.
- 12) PERFORMANCE APPRAISAL OF TRANSPORT SYSTEM WITHIN THE ABUJA METROPOLIS

INNOVATION IN ROADS, BUILDING AND ENGINEERING FABRICATION

One of the Mandates of NBRRI is to conduct research into Local building & construction materials to determine the most effective & economic methods for their utilization

In line with this NBRRI, developed new ways of using available local materials for building, road and fabrication for delivery of infrastructural facilities in the country

RESEARCH AND DEVELOPMENT DEPARTMENT

Production of Asphalt from Natural sand and bitumen

Pothole repair remains one of the major problems faced when carrying out maintenance on roads constructed using Asphalt.



(a) Natural Bitumen sand collected from Agbabu, in Ondo State



(b) Heated Natural Bitumen Sand



(c) MC1 used for priming



(d) Produced Asphalt using Natural sand and Natural Bitumen

RESEARCH AND DEVELOPMENT DEPARTMENT

Bamboo Use As Reinforcement



Sourcing Bamboo



Preparing beams and Columns



Arranging Bamboo for treatment



Stair Wall Reinforcement



Casting Foundation



Details of Bamboo Reinforcement on First Floor



Complete NBRI storey Building with Bamboo as Reinforcement

RESEARCH AND DEVELOPMENT DEPARTMENT

Rubberized Asphalt Mat (RAM)

The Rubberized Asphalt Mat (RAM) is a technology which was developed at NBRI and can be used for quick patch especially for the maintenance of low traffic asphalt road



Coarse Aggregate



Bitumen



Waste tyres



BITUMEN MODIFICATION



AGGREGATE AND BINDER MIXING



(RAM COMPACTION)



RUBBERIZED ASPHALT MAT

Stages of production of Rubberised Asphalt Mat

RESEARCH AND DEVELOPMENT DEPARTMENT

DESIGN AND FABRICATION OF INTERLOCKING SANDCRETE BLOCK MAKING MACHINE

The R&D is to design and fabricate Interlocking Sandcrete Block Making Machine to produce interlocking sandcrete blocks with high compressive strength.

This machine can be locally fabricated, and it will help the government in saving foreign exchange that should ordinarily be spent on importation of this kind of machines.

Its construction in the country will also help in the growth of small and medium enterprises (SMEs) in construction and other related sectors

RESEARCH AND DEVELOPMENT DEPARTMENT

PICTURE OF INTERLOCKING SANDCRETE BLOCK MAKING MACHINE



RESEARCH AND DEVELOPMENT DEPARTMENT

NBRRI Earth Compactor/Road Cutter

Nigerian Building and Road Research Institute (NBRRI) conceived, designed, developed and fabricated an earth compacting machine with incorporated road cutter to ease the construction of access roads, road repairs as well as foundation works. With the incorporated road cutter; which is a novel innovation; the developed machine has great advantage over the imported compactor(s) and road cutter(s).

RESEARCH AND DEVELOPMENT DEPARTMENT

Picture NBRRI Earth Compactor/Road Cutter



RESEARCH AND DEVELOPMENT DEPARTMENT

DESIGN AND FABRICATION OF AUTOMATIC WALL PLASTERING MACHINE

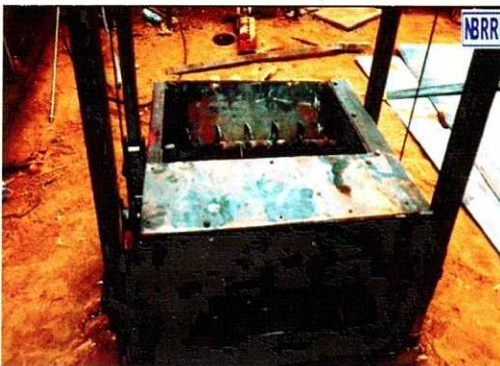
Reduced labour cost and other related costs: The technology reduces labour time/number of labour required, cost associated with using scaffolds as the machine can go up to 3m, and cost associated with safety issues

Improve productivity and rendering quality: Eliminates fatigue as a result of repetitive action and high demand for skilled labour

Lower execution time: As plastering consumes one third of the time for total building construction, reducing time associated with the plastering process will significantly reduce construction time

RESEARCH AND DEVELOPMENT DEPARTMENT

PICTURE OF WALL PLASTERING MACHINE



RESEARCH AND DEVELOPMENT DEPARTMENT
DEVELOPMENT OF PLASTIC MELTER DENSIFIER AND EXTRUDER
MACHINE FOR THE PRODUCTION OF PLASTIC BRICKS

Plastics are synthetic, non-biodegradable materials that are commonly used in the production of bags, bottles, and so on due to its light weight and the ease of moulding into desired shapes. The machinery is suitable in the production of building materials such as paving stones, blocks, roofing tiles, kerbs and so on.

RESEARCH AND DEVELOPMENT DEPARTMENT

Picture of the Plastic Melter Densifier



RESEARCH AND DEVELOPMENT DEPARTMENT

USE OF WASTE PLASTIC BOTTLES FOR ROAD APPLICATION

There is no doubt that the use of waste plastic in bituminous road construction has recently gained global attention. In Nigeria, we are still at the fundamental of implementing this strategy of building sustainable roads using shredded waste plastic.

RESEARCH AND DEVELOPMENT DEPARTMENT

PICTURE FROM THE USE OF WASTE PLASTIC BOTTLES FOR ROAD APPLICATION



RESEARCH AND DEVELOPMENT DEPARTMENT

Natural Bitumen Mix Design Specification Development for Road Construction

The project is about investigation into utilising natural bitumen in Nigeria for road construction.

The use of the natural bitumen in the road sector undoubtedly creates jobs from technical to non-technical staff and other jobs in the value chain.

In addition, it would stop the issue of capital flight, thereby enhancing the economy.

RESEARCH AND DEVELOPMENT DEPARTMENT

Natural Bitumen Mix Design Specification Development for Road Construction



Application of MC1



Prepared road surface
Natural bituminous (stone base)



Natural bituminous (stone base) surface at
5, 10 & 15% natural bitumen

LABORATORY EQUIPMENTS

As part of the cardinal principle of the DG/CEO, Equipping of the Laboratories in the Institute has taken a front burner at the National Laboratory Complex, (NLC), Ota, the Administrative Headquarters Abuja and the Zonal Offices were major priorities in the 2023 Financial Year .

The Institute procure and install state-of-the-art equipment for Road, Building and Engineering Materials Laboratories

This is to elevate the quality of research and ensure accurate results in the the Institute Laboratory .These laboratories can boast of equipment that are not only exclusive to NBRRI, and first in Africa.

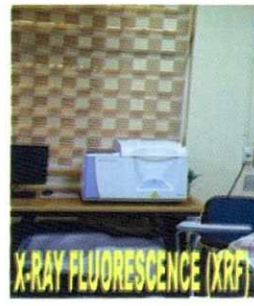
NEWLY ACQUIRED LABORATORY EQUIPMENT PICTURES



AUTO SOIL COMPACTOR



CEMENT APARATUS



X-RAY FLUORESCENCE (XRF)



CBR MACHINE



CONSTANT
TEMPERATURE BATH



CONSTANT
TEMPERATURE BATH



X-RAY DIFFRACTION (XRD)



X-RAY FLUORESCENCE (XRF)

NEWLY ACQUIRED LABORATORY EQUIPMENT



MUFFLE FURNANCE

NUMBER OF PUBLICATIONS

In 2023 the Institute published 11no Technical Reports.

These reports covers all the results of Research and Development and Innovations from the technical Departments .

These report are products of completed research works in print

LIST OF PUBLICATIONS BY NBRRI IN 2023

- i. Pavement failure: Technical Investigation of two-lane dual carriage Enugu- Onitsha Federal Highway .
- ii. Assessment of Gwaram and Basirka Bridges in Jigawa state, Nigeria
- iii. Structural Integrity assessment of proposed office Development for the National Directorate of Employment, FCT, Abuja
- iv. Investigation of Frequent Failure of Roads in Nigeria: case study of Bauchi- Gombe A345 Federal Highway
- v. Technical Report on the Design and Fabrication of Machine for production of Grooved- Interlocking blocks for conduit wiring
- vi. Technical report on the Workability and strength properties of concrete made from NBRRI Pozzolana
- vii. Technical report on the design and Fabrication of Palm kernel shell grinding machine for the production of Pozzolana cement
- viii. Soil Erosion studies in Nigeria: Case of Highways in South- Eastern Nigeria
- ix. Technical report on investigating the cost variation of Building and construction materials in Nigeria
- x. The use of NBRRI stabilisers for erosion control in Ebonyi state: A demonstration project
- xi. Technical report on the Investigation of three storey collapsed building under construction at Beirut road (GSM Market) in Kano, Kano state

OUTPUTS LEADING TO DELIVERY OF OUTCOMES

- A. NBRRI PILOT POZZOLANA CEMENT PLANT
- B. CHARACTERIZATION OF BITUMEN FROM NIGERIA TAR SAND DEPOSITS
- C. SUBGRADE SOIL ATLAS OF NIGERIA
- D. BAMBOO HOUSE (BAMBOO AS REINFORCEMENT)
- E. STRUCTURAL INTEGRITY OF BUILDINGS AND BRIDGES
- F. BUILDING COLLAPSE
- G. NBRRI FIRE RETARDANT
- H. PLASTERING MACHINE
- I. RUBBERIZED ASPHALT MAT FOR LOW VOLUME ROAD PATCHING

USE OF NBRRI INNOVATIONS IN ADDRESSING INFRASTRUCTURAL DECAY IN NIGERIA

The NBRRI is saddled with research into alternative construction materials.

This role did not end on the shelves but in practical demonstration of effectiveness, efficiency and cost reduction in applying the Innovations of the Institute in road, housing and engineering material sector to mitigate the gap in the nation's infrastructure.

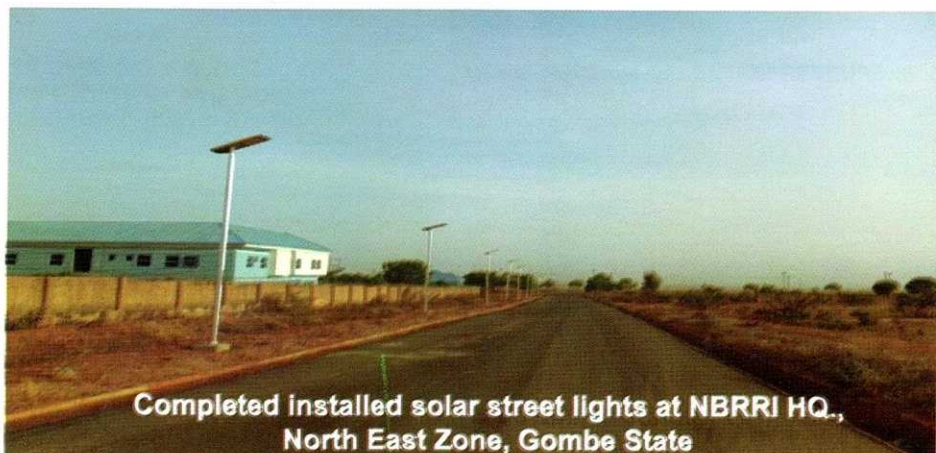
PICTURES OF PROJECTS COMPLETED IN VARIOUS GEO-POLITICAL ZONES IN NIGERIA NORTH EAST



**NBRRI DEMONSTRATION OF BLOCK OF
THREE (3) CLASSROOMS WITH OFFICE (GOMBE STATE)**



COMMUNITY TOWN HALL TAL, BILLIRI LGA, GOMBE STATE



**Completed installed solar street lights at NBRRI HQ,
North East Zone, Gombe State**

PICTURES OF PROJECTS COMPLETED IN VARIOUS GEO-POLITICAL ZONES IN NIGERIA

NORTH EAST CONT'D



CONSTRUCTION AND REHABILITATION OF TOWNSHIP ROADS IN KATSINA SOUTH SENATORIAL DISTRICT, KATSINA STATE



BLOCK OF THREE CLASSROOMS TO THE MANAGEMENT OF ZUL COMMUNITY SECONDARY SCHOOL IN TORO LGA OF BAUCHI STATE



NBRRI COMMISSIONED AND DONATED A BLOCK OF THREE (3) CLASSROOMS AT WAJAH GIRLS PRIMARY SCHOOL IN HONG LOCAL GOVERNMENT AREA OF ADAMAWA STATE.



BLOCK OF 3 CLASSROOMS IN GOVERNMENT SECONDARY SCHOOL, GINDIN DOROWA COMMUNITY IN WUKARI LOCAL GOVERNMENT AREA OF TARABA STATE

PICTURES OF PROJECTS COMPLETED IN VARIOUS GEO-POLITICAL ZONES IN NIGERIA

NORTH WEST



CONSTRUCTION OF BLOCKS OF CLASSROOM IN SELECTED AREAS OF GAYA, AJINGI AND ALBASU FEDERAL CONSTITUENCY, KANO STATE



CONSTRUCTION OF AUDITORIUMS, LECTURE HALLS AND OTHER INFRASTRUCTURE IN SOME SELECTED HIGHER INSTITUTION OF LEARNING (COMPLETION OF EDUCATION CENTRE GWAMAI),



NBRRRI DEMONSTRATION OF 3 BLOCKS OF CLASSROOMS WITH OFFICE AND FURNITURE AT DIFFERENT LOCATION (KEBBI STATE),



CONSTRUCTION OF ENTREPRENEURSHIP DEVELOPMENT CENTRES IN KATSINA

PICTURES OF PROJECTS COMPLETED IN VARIOUS GEO-POLITICAL ZONES IN NIGERIA NORTH-CENTRAL



DEMONSTRATIONS OF BLOCK OF THREE (3) CLASSROOMS WITH OFFICE AND FURNITURE AT DIFFERENT LOCATIONS (BENUE STATE)



RENOVATION OF PF LUKEMAN ISLAMIYA (LEA) PRIMARY SCHOOL, LAFIA (LEA PRIMARY SCHOOL, REFUGE CAMP, LAFIA)



CONSTRUCTION OF TOWNSHIP ROADS IN PAIKORO (TUNGA) AND GURARA (DIKO) IN NIGER EAST SENATORIAL DISTRICT



CONSTRUCTED BOREHOLE AT KAFIN KORO COMMUNITY, PAIKORO LOCAL GOVERNMENT AREA, NIGER STATE



PROVISION OF BUILDING INFRASTRUCTURE AT ST. PETERS COLLEGE IDAH AND OTHER SELECTED AREAS



COMPLETION OF FM STATIONS IN EDU AND KAIAMA LGAS.

PICTURES OF PROJECTS COMPLETED IN VARIOUS GEO-POLITICAL ZONES IN SOUTH EAST NIGERIA



**A COMPLETE VIEW OF THE BLOCK OF 3 CLASSROOMS
IN COMMUNITY SECONDARY SCHOOL IN IGWELEDOHA
COMMUNITY IN IKWO EZZA SOUTH IN EBONYI STATE.**



COMPLETION OF OKPANKU HALL, ENUGU STATE



**CONSTRUCTION AND REHABILITATION OF TOWNSHIP SCHOOL II STADIUM IN
IGBO-EZE SOUTH LGA, ENUGU STATE**

PICTURES OF PROJECTS COMPLETED IN VARIOUS GEO POLITICAL ZONES IN NIGERIA

SOUTH-SOUTH



CONSTRUCTION OF NBRRI MODERN MARKET AT AZUNZU, UMUSADEGE, KWALE IN NDOKWA / UKWUANI FEDERAL CONSTITUENCY, DELTA STATE



CONSTRUCTION OF WING "A&B" OF STUDENTS HOSPITAL IN FEDERAL POLYTECHNIC, OROGUN, DELTA CENTRAL SENATORIAL DISTRICT, DELTA STATE



CONSTRUCTION AND FURNISHING OF ONE E-LEARNING CENTRE WITH AN E-LIBRARY WITH BOTH CONVENTIONAL AND SOLAR ENERGY AT EFFRUN-OTOR, SECONDARY SCHOOL, UGHELLI SOUTH LGA, DELTA CENTRAL SENATORIAL DISTRICT



CONSTRUCTION OF TWO NOS BLOCK OF 6 CLASSROOMS EACH WITH SEPARATE TOILETS FOR FEMALE AND MALE STUDENTS TEACHERS AT EFFRUN-OTOR, SECONDARY SCHOOL, UGHELLI SOUTH LGA, DELTA CENTRAL SENATORIAL DISTRICT



NBRRI DEMONSTRATION OF BLOCK OF THREE (3) CLASSROOMS WITH OFFICE AND FURNITURE AT DIFFERENT LOCATION (AKWA IBOM STATE)

PICTURES OF PROJECTS COMPLETED IN VARIOUS GEO-POLITICAL ZONES IN NIGERIA

SOUTH-SOUTH CONT'D



REHABILITATION AND CONSTRUCTION OF ROAD IN RIVERS SOUTH-EAST SENATORIAL DISTRICT, RIVERS STATE, NIGERIA

PICTURES OF PROJECTS COMPLETED IN VARIOUS GEO-POLITICAL ZONES IN NIGERIA

SOUTH-SOUTH CONT'D



CONSTRUCTION OF 3KM, IKOT UKANA-IKO-AKPAN ESSIEN-EDITAHA -IKOT UDOM ROAD IN OBOT AKARA LGA AKWA IBOM NORTH-WEST SENATORIAL DISTRICT, AKWA IBOM STATE

PICTURES OF PROJECTS COMPLETED IN VARIOUS GEO-POLITICAL ZONES IN NIGERIA

SOUTH WEST



CONSTRUCTION OF CLASSROOMS WITH OFFICE AT 9 BRIGADE PRIMARY SCHOOL, IKEJA



RENOVATION OF IJEDE MARKET IN OBALE, IKORODU



CONSTRUCTION OF MODERN MARKET IN IKORODU FEDERAL CONSTITUENCY,

NBRRI SOLUTIONS AT SOLVING BUILDING COLLAPSE

Through the Institute intervention in conducting studies on collapsed building and bringing out Technical Report on such ,NBRRI has successfully reduce the incidence of building collapse in Nigeria.

The outcome of the investigations were revealing and far reaching recommendations made. Some relevant government establishments were sensitized. So also were some professional bodies such as COREN, CORBON, ARCON and NEMA

NBBRI INTERVENTION ON BUILDING COLLAPSE

NBBRI efforts in the past years have yielded a lot of revelation in this regard.

The outcome of the investigations was revealing, and far-reaching recommendations were made.

The building collapse cases investigated by the institute are usually compiled and produced in form of a technical report.



Building Collapse Site (Gwarimpa, Abuja)



Building Collapse Investigation at Kubwa, Abuja

NBBRI SUMMARIES CAUSES OF BUILDING COLLAPSE

NBBRI summaries some of the causes of building collapse as follows



Sub-standard Materials



Poor Workmanship



Poor supervision/



Lack of proper topography and soil investigation



Absence of Building or Planning Permit, Corruption



Inadequate designs

CONCLUSION

NBRRI is the only Research Institute with a singular mandate to conduct applied research into alternative materials for the Building, Roads, Engineering Materials and Science Laboratory Technology development needs of the nation, its prospects are enormous.

1. Opportunities

Servicing of the Construction Industry: Recent events in the Nigerian Construction Industry has brought to light the need for quality control in Building and Road materials and its application. Both for imported materials and locally made ones.

NBRRI can collaborate more actively with other stakeholders in the industries. This will expose NBRRI personnel to the needs of the Industry. This in turn will position NBRRI to conduct more precise research results of which may assist in attaining improved products.

NBRRI products may be commercialized and the Institute can generate its revenue.

Adequate popularization of NBRRI's research and development activities will positively enhance NBRRI's growth and contribution to nation-building.

2. Challenges

Poor funding, which is very vital to Research and Development.

Poor patronage of NBRRI products.

Preference of use of conventional building materials for NBRRI alternative construction materials.

3. Way Forward

These challenges can be overcome if Government provide adequate funding, and if more Research and Technical staff are employed.

Collaboration with both foreign and local stakeholders should be encouraged through exchange programme.

The issue of Quality Control may be attained with the establishment of Standard Laboratories.

Modernization of the Institute Library may improve access to knowledge or information on Research and Development matters.

SOCIAL DIARY



NBRRI SPORT FACILITIES

NBRRI Stadium



Work in progress at NBRRI Stadium, Ota

NBRRI NEWSLETTER

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VISION

To evolve and use a comprehensive and integrated approach in capacity building and investment promotion so as to foster the application of environment friendly and energy efficient innovation, construction materials, manufacturing technologies and cost effective building and road construction practices, which will enhance job creation, wealth generation and poverty reduction as well as nurture the emergence of vibrant, knowledge based and highly competitive indigenous construction companies capable of meeting global standards.

MISSION

Integrate R & D, Capacity building and robust extension services in which technology innovation and knowledge based practices in the fields of building road and engineering materials will be used to provide adequate and affordable housing and road infrastructure as well as increased economic empowerment.

CORE VALUES

- Professionalism
- Resourcefulness
- Commitment and Integrity
- Innovativeness

Published by Nigerian Building and Road Research Institute (NBRRI)

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