Sustainable Infrastructure and Construction Engineering Research

Department of Civil Engineering

University of Nigeria, Nsukka (UNN)

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1. **Name:** Sustainable Infrastructure and Construction Engineering Research

2. **Introduction & Justification**

The taxonomy of infrastructure in civil engineering and built environment include: bridges, roads, railways, airports, water, water treatment, dams, civil works in integrated power projects and telecommunications, and other public works. According to a PricewaterhouseCoopers (PWC) report published in August 2014, the global infrastructure spending is estimated to grow from **$4 Tr**illion per year in 2012 to more than **$9 Trillion** per year in 2025. The overall projection in infrastructure spending is close to **$78 Trillion** between 2014 and 2025. Nigeria's annual infrastructure spend is expected to reach **$77 Billion** in 2025, for sustainable economic growth and expansion. The report noted that growing urbanisation in emerging markets such as China, Indonesia, and Nigeria should boost spending for such vital infrastructure sectors such as water, power and transportation.

Thus, it is expected that over the next several years, global and local research will focus on renewal of civil infrastructure systems in civil engineering and the built environment, application of advanced information and communication technologies (ICT) to condition assessment and structural health monitoring, and infrastructure asset management. Other areas include intelligent design, construction, maintenance, operation and decommissioning (a holistic life cycle view of civil engineering products). One of the emerging global research frontiers includes topics such as Resilient and ***Sustainable Infrastructure***. Other areas include innovative materials for sustainable infrastructure and construction including **Nanotechnology** and **Nanomaterials**, and critical infrastructure systems. Infrastructure security is very necessary given Nigeria's recent experiences on terrorism that targets people and national infrastructure assets. There is a paradigm shift on research with a focus on **integrative** and interdisciplinary/multidisciplinary research. Sustainable Infrastructure and construction engineering research in the Department of Civil Engineering UNN is well situated to respond to these emerging research needs and paradigm shifts. The proposed research thrust has been developed over the past six years in the department of Civil Engineering. The research group will pursue global collaborative research as part of an overarching strategic plan which includes eventual evolution to a self-sustaining ***Centre of Excellence***. .

3. Research Focus

The research is multi-/inter-disciplinary. It covers several areas as they impinge on sustainable infrastructure delivery and construction engineering. These include::

- Construction Engineering and Management
- Transportation
- Water and Environmental Systems
- Smart and Intelligent Buildings
- Infrastructure Procurement Systems (e.g. PPP, PFI, BOOT etc)
- Advanced ICT and Intelligent Systems in Civil Engineering and Construction
- Innovative Construction Materials and Processes
- Critical Infrastructure Systems Security and Vulnerability Analysis
- etc

4. Proposed Research Topics

Specific research topics will be developed along the focus areas highlighted in the preceding section. .

5. Composition of Members

The table below gives summary of the members. Their brief CVs are also attached. It is envisaged that the group will expand with time.

Table 1: Research Group Members

S/No	Staff Name	Position	Area of Specialisation	Role
1	Engr. Prof. UGWU Onuegbu Okoronkwo	Professor	Construction Engineering & Management	*Coordinator*
2	Engr. Dr NWOJI Clifford Ugochuku	Snr. Lecturer	Structures & Construction Management	*Member*
3	Dr NNAJI Chidozie Charles	Lecturer I	Water Resources & Environmental	*Member*
4	Arc Engr. AMADOU Adamou	Lecturer I	Building/Structures	*Member*

6 Brief CVs of Members

The brief CVs of the research group are attached as appendices 01 – 04.
Appendix 01 – Engr. Prof. O. O. Ugwu CV
Appendix 02 – Engr. Dr. C. U. Nwoji CV
Appendix 03 – Dr. C. C. Nnaji CV
Appendix 04 – Arch. Engr. A. Amadou CV