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THE USE OF BUILDING REGULATION AND ITS EFFECT IN BUILDING PROJECT DELIVERY IN ENUGU METROPOLIS.

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Key words: *Building Regulation, Building Project, Building Delivery, building Code*

Abstract: *The study focused on the building regulations and its effect in Nigeria industry. The specifically objectives are; The broad objective of the study is to examine the building regulations and its effect in Nigeria building industry. The specific objectives are to, examines the roles of professional builders in the implementation and enforcement of building regulations in Nigeria, examine the level of violation and compliance of building regulations in Nigeria building industry, explore the relevance of implementation and enforcement of building regulations in the building practice in Nigeria, provide solution to the challenges hindering the adoption of national building regulations in the Nigeria building industry. The survey research design was used for the study. The target population of this study shall be 200 registered contractors in Enugu urban, 75 consultants and 400 clients, which summed up to 675 respondents. Sample size of 164 was gotten through Taro Yamane formula. The findings of the study reveal that the level of violation of building regulations in the Nigeria building industry is very high as most engineers do not adhere to the guiding principles of national building regulations, National building regulations has been grossly neglected by the building engineers, Some of the building engineers are ignorant of the building regulations. Study recommends that there is need for relevant authorities to enforce rules on the implementation and enforcement of national building regulations so as to reduce the rate of building collapse and building abandonment in Nigeria and Enugu state in particular.*

INTRODUCTION

Building is as old as humanity whose product it is; and has evolved through centuries of activities, from dwelling in caves to skyscrapers and recently to intelligent structures that can smartly respond to stimuli in its environment. Mosaku *et al* (2006) observed that building practice has also undergone a great deal of metamorphosis in response to the dynamic nature of human needs and development.

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Essentially however, building design and construction are processes which traditionally involve several professionals collaborating for relatively short periods to develop a facility (Anumba, 2006).

Building is the third most essential need of mankind, that is, after food and clothing. In addition, building appears to be the most precious and demanding asset. This is simply because every other activity of man needs shelter. Therefore, the way and manner in which buildings are built must be controlled and regulated for the health and safety of the users. The quality of building control and regulations in Nigeria is a subject of discussion. For a system to be efficient and effective, there is always a requirement for control and balance, which is in the form of regulation for an essential action (Obabori, 2022). Building control makes statutory and routine checks at various phases of building works to certify compliance with the building regulations, whereas building regulations establish legal requirements and standards for design and erection of buildings to safeguard the health and safety of building users (Local Authority Building Control (LABC) 2017). Building regulations set the minimum requirements to ensure compliance throughout the building cycle in order to achieve affordability, sustainability, accessibility and resource efficiency (Interjurisdiction Regulatory Collaboration Committee (IRCC) 2020). Building regulations aims to guarantee the application and enforcement of these minimum requirements (Pedro, 2020). Building control and regulations are in the form of laws and authorities given to the public officials by the government (Obabori, 2022). The responsibilities in the areas of building control and regulations have been left to individuals who have little or no knowledge about building profession, and this has made it very difficult for the unit to achieve the reasonable success in the building industry. To work out the responsibilities in these areas, some issues have to be discussed and addressed. The issues include employment of qualified candidates in the units and enforcement of the regulation and development programme for workers to the majority of accidents within a construction site are not triggered by careless workforces but caused by failures in compliance with standard and control, which are mostly the responsibilities of the management.

The National Building Regulations (NBC) is a mandatory and recommendatory document adopted by development authorities, to formulating building byelaws. It provides guidelines for regulating building materials, services, systems and processes (Iroegbu, 2017). The National Building Regulations lays down the minimum provisions buildings need in order to ensure public safety with regards to structural sufficiency, fire hazard and health aspects. It

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contains administrative provisions, development control rules and general building requirements. It also serves as a mode regulations (MC), for adoption by anybody involved in construction in the public or private domain (Iroegbu, 2016). Primarily, when national Building Regulations is mentioned, the focus is always on urban areas and formally engineered structures.

Serious concerns have been expressed about building projects which have been handled by quacks and the use of substandard materials (Ngwu, 2021). The practice of building control and regulations requires the effective enforcement and appropriate skills as well as good and sound management skills in pursuance of all the standards in building works. The application of building control and regulations practice is an efficient approach which would aid in improving the competence of both the design and construction team and enable the building industry to efficiently deliver building projects that are construction-friendly and failure-free, thereby attaining environmental development objectives. The need for expertise in the practice of building control and regulations assumes the special significance in order to ensure that good practice in building construction is adopted with the use of standard specifications for the benefits of building users (Chukwu, 2023). Specification standards and construction regulations are drivers of good standard of construction.

When building control and regulations are practised efficiently, it would result in great and tangible benefits for both building owners and users in Nigeria. The issues relating to difficulties in obtaining the certificate of occupancy will be minimized if not completely eradicated in the system.

Statement of the Problems

The National Building Regulations and regulations lays down the minimum provisions buildings need in order to ensure public safety with regards to structural sufficiency, fire hazard and health aspects which should be strictly enforced by the professional builders but are not usually done this has led to building collapse, fire disaster, increase in maintenance cost and several other negative impact.

Primarily, when building regulations is mentioned, the focus is always on urban areas and formally engineered structures. With about 75% of built structure in the country being non-engineered, the non-inclusion of National Building Regulations according has led to several housing problems and housing disaster in the region. These problems could have been managed or stop by the intervention of the professional builders in implementing the national building regulations in the rural region of the nations.

In urban areas, the non-implementation of national building regulations has led to slum housing, periodic renewal of certificates for

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occupied building from a structural, fire and electrical safety point of view and facilities for the physically challenged persons. A key element is the inclusion of a complete philosophy and direction for successfully executing building projects through an integrated, multi-disciplinary approach from the conceptual stage to planning, designing, construction, operation and maintenance.

Aim and Objectives of the Study

Aim of the Study

The main aim of the study is to investigate into the use of building regulation and its effect in building project delivery in Enugu metropolis.

Objectives of the Study

Specifically, the study tends to

1. Examines the roles of professional builders in the implementation and enforcement of building regulations in Nigeria
2. Examine the level of violation and compliance of building regulations in Nigeria building industry.

Research Questions

This study shall be guided by the following research questions

1. What are the roles of professional builders in the implementation and enforcement of building regulations in Nigeria?
2. What are the level of violation and compliance of building regulations in Nigeria building industry?

Hypotheses of the Study

This study will be guided by the following null hypotheses

H_{o1}: The role of professional builders has no significant effect on the implementation and enforcement of building regulations in Nigeria.

H_{o2}: The level of violation and compliance of building regulations in Nigeria building industry is not significant.

Scope of the Study

The research focuses on the building regulations and its effect in Nigeria building industry. Specifically, the study covers: the areas of component of the regulations, importance of the regulations and challenges of the regulations. The study will be limited to exploring the roles of professional builders in the implementation and enforcement of building regulations in Nigeria, examine the level of violation and compliance of building regulations in Nigeria building industry. Determine the effect of building regulations on the Nigeria construction industry and develop strategies for effective adoption and implementation of building regulations in Nigeria building industry.

Nigerian construction industry

Historically, the construction industry has always been related to the process of industrialisation and development (Lopes, Oliveira & Abreu, 2017). The productivity of the construction industry in Nigeria, according to

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Aniekwu, Igboanugo and Onifade (2015), is very low compared with other industries, which is the result of a continuously used traditional project delivery method, which fails to effectively encourage the integration between design and construction, as well as the coordination and communication between participants of the construction industry. The Infrastructure Client Group (2015) states that; traditional methods are burdened with significant shortcomings that affect ways for the preparation and handling of construction projects. The industry consists of both the public and private sectors, but it is mostly private, while activities includes the procurement of goods and services, and the execution of various projects, such as building, civil engineering, power and energy, etc. (Okoye, 2016).

The construction industry is the means, through which nations realises their potential goals for urban and rural development (Kanyago et al., 2017), while its activities and products are an essential part of the national economy and industrial development in developing countries, one of which is Nigeria (Okoye, 2016). Globally, the construction industry accounts for 6-9% of the Gross Domestic Product (GDP) of many countries (Kanyago et al., 2017). In Nigeria, the industry accounts for a substantial percentage of the Gross National Product (GNP) and constitutes almost half of the total public spending (Aniekwu et al., 2018). The relationship between the construction sector and the actual GDP was found to be significantly and strongly positive (Okoye, 2016).

The Nigerian construction industry mainly consists of small and medium construction firms, with very few large multinationals. Most construction firms have less than ten employees, while several multinationals have hundreds (Jimoh, 2017). According to Okoye (2016), construction workers in Nigeria are hardly literate and poorly paid, having to work long hours under poor workplace conditions, which is often dangerous manual work. The Nigerian construction industry plays an essential role in the national economy. Up to now, it has been battling with serious issues and challenges, such as cost overruns, project delays, economically unviable design, poor workmanship, rework, inadequate specifications, impracticable and uncontrolled schedules, deficient detailing, misunderstandings among project team members, and abandoned and uncompleted public and private building projects. These days, it is extremely common to see a collapsing building. Such frequent incidents have shaped a negative public opinion about the industry. Consequently, there is a pressing need to improve the BPM practice in the country.

Building Practice in Nigeria

Organized building practice in Nigeria dates back to the 1930s when the very few construction activities of significance in the country were

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handled by the Public Works Department (PWD) and the Royal Army Engineers which was later transformed into the Nigerian Army Engineers. Direct labour was the mode of construction project delivery at this time. Construction contracting in Nigeria began in the 1940s with a few British and Italian companies coming into operation (Olowo-Okere 2015). Nigeria's independence in 1960 brought an upward trend in construction activities and until the late sixties, most of the available construction organizations were overstressed with contracts. Construction contracting in Nigeria witnessed an overwhelming upsurge during the "oil boom" of the 1970s and up to the end of the second republic in 1983. Unfortunately, the period also witnessed an unprecedented level of degeneration of standards in the project delivery process. Projects were poorly conceived, carelessly planned and shabbily executed. The result was unreasonably high time and cost overruns, low quality and widespread abandonment.

This widespread abuse of the contract system was probably responsible for the National Council of Work's recommendations in its 13th annual conference in 1984. It recommended direct labour system for capital project delivery, which gained wide acceptance at all the three tiers of government, under the military government of that era. Although some impressive results were obtained at the initial stage of this regime (Dawaki, 2017); abuses were also later discovered. For example, it has been said that direct labour projects are usually ineffectively managed to the extent that it may become even costlier and longer to execute projects than when the contract approach is used (Sanni, 2017). What is of fundamental importance therefore may not be the mode of delivery adopted but the integrity, managerial and professional competence of the executors. The public sector constitutes the major client of the construction industry in Nigeria, and the traditional approach in this sector is to handle building design and construction in two separate phases and by two separate teams – the design and construction teams. The design team usually consist of consultant or in-house professionals such as: architect, quantity surveyor, structural engineer and services engineer (electrical and mechanical). The construction team, on the other hand, usually consists of a major constructor and a number of sub-contractors who are selected on the basis of lump sum competitive tender, undertaken after completion of most of the design activities. This approach offers the lowest chance for integration of construction experience into design. The result is the delay of project execution and high level of difference between the designed and constructed products. Gidado (2016) and Ogunsanmi (2017) opined that the system of contract procurement is a strong factor in determining the nature of

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relationships between the design and the construction teams. Other procurement methods that aim at better integration of the two sets of experience, and better overall project success have also evolved in the country. Such other methods include: management contracting, construction management, partnering and design and build.

Until 2006, Nigeria was without uniform regulations, guidelines and standards for the design, construction and operation/maintenance of buildings. This manifested in a range of deplorable state of affairs in the building construction industry and in the built environment. The building construction industry became an all comers field, patronizing nonprofessionals and utilizing untested and uncertified materials and components. This in turn resulted to incessant collapse of buildings, fire infernos and other disasters. The built environment, to say the least, became unsustainable, and towns and cities largely characterized by planlessness. In view of these, the National Council on Housing and Urban Development instituted the process of evolving a National Building Regulations which sought to proffer solutions to the hazardous trends in the building construction industry. The code provided the minimum standards for building pre-design, design, construction and post-construction with a view to ensuring quality, safety and proficiency in the building industry. The regulations has since been accorded a legal status in the country. What has remained an enormous task is the enforcement and wide application throughout the country.

Concept of Building Regulations

Studies regarding building regulations have been carried by several authors across the globe. Building regulations are legal tools used to ensure socially acceptable efficiency in construction and in the health and safety of the surroundings of its users (Emodi & Yusuf, 2015). Building regulations are the forms of laws provided by government to public officials in the construction sector (Ezema, 2015). Ezema et al., (2016) postulate that building users' safety and health are ensured due to building regulations which set legal criteria and specifications for building design and construction. The objectives of construction regulations are to ensure compliance. Building regulations need to be sensitive to dynamic, technical and market conditions while regulating building erection and usage (Olayemi, 2017).

The British Building Regulations, for example, are mandatory quality requirements and are mainly designed to protect general interests, including 'the well-being, protection, and convenience of people inside and around buildings (Mu'azu, 2018). Building regulations set minimum standards for ensuring compliance during the construction process in order to achieve affordability, sustainability, accessibility

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and resource efficiency. Furthermore, the customer will be protected from individual and corporate violations as a result of the due process embedded in such regulations (Naibbi & Healey, 2019). The implementation of the practice of building control and regulations is an innovative solution that will help to enhance the expertise of the designers' as well as the constructors' teams and allow the construction sector to produce construction works that are construction-friendly and failure-free and thus achieve environmental and climate growth goals.

Importance of Building control and Regulations in Nigeria Construction Industry

Building regulations provide a clear understanding of the technical requirements in the building system (Sheridan et al. 2023). In the practice of building control and regulations, the quality of materials used in the building project will be of paramount importance, amongst others. The study by Lychgate Projects Ltd. (2019) revealed that building control helps in achieving project objectives such as risk reduction and delivering safe buildings. Building regulations provide building users with confidence that buildings of the same type built within a vicinity are benchmarked against the same standards and can minimize the uncertainties in the transactions of new building construction (Inter-jurisdiction Regulatory Collaboration Committee (IRCC) 2020). The important elements of the Building Control service, as outlined by Lychgate Projects Ltd. (2022), are as follows: co-operative and helpful, provides timely advice and service, professional, responsive, flexible, offers advice proactively, part of the project team and gives good quality technical advice.

Roles of Professional Builders in the Implementations and Enforcement of National Building Regulations

Workmanship and Supervision: All building works shall be executed, installed and completed in a skillful and acceptable manner so as to secure the result intended by the regulations. All building works shall be generally supervised by a registered architect and engineer in line with their inputs. Any contractor who is engaged to carry out construction work in accordance with the regulations shall satisfy the professional registration laws of the country. The management of the execution of the building works including the supervision of artisan and tradesmen shall be carried out by a registered builder.

Alternative Materials: The provision of this regulations are not intended to prevent the use of any material not specially prescribed by this regulations, provided that an alternative has been approved and its used authorized by the building regulations advisory committee. The Regulations Enforcement Division/Section/Unit shall allow any such alternative, provided they

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finds that the proposed designs is satisfactory and complies with the provisions of the regulations and that the materials, methods or works offered is for the purpose intended, at least the equivalent of the prescribed in this regulations in suitability, strength, effectiveness, fire resistance, durability safety and sanitation. The regulations enforcement division/section/units shall require the sufficient evidence or proof be submitted to substantiate any claims that may be made regarding its use. The details of any actions granting approval of an alternate shall be recorded and entered in files of the Regulations Enforcement Division/Section/Unit.

Various Professional Regulatory Boards in the Nigerian Construction Industry

1. Quantity Surveyors Registration Board of Nigeria (QSRBN)

Is the regulatory body of the quantity surveying profession and practice in Nigeria. It was established by Decree No. 31 of December 5, 1986, now CAP 383 Laws of the Federation of Nigeria (LFN). It goals includes:

a) To ensure that all quantity surveying graduates produced by higher institutions of learning in Nigeria meet internationally required standards.

b) To eliminate quackery and ensure that all Quantity Surveyors employed in both the private and public sectors are registered with QSRBN.

c) To ensure that firms carrying out quantity surveying services in the country are registered with the Board and adhere strictly to the best practices and regulations of conduct of the profession.

The body executes its mandate through training, registration and enhancement of ethical practice. According to the regulations, no person should practice under any name, title or style containing any of the words or phrases "quantity surveyor" or "quantity surveying" unless he is registered under the Law as a Quantity Surveyor. An Architect is a person trained and licensed in the planning and designing of buildings, and participates in supervising the construction of a building. The work of an architect is to advise his clients, study their needs, to prepare, direct and co-ordinate design and to supervise works executed under a building contract. An architect or quantity surveyor in Nigeria must have a minimum of five years of approved training followed by a minimum of one year of professional experience in Nigeria to the satisfaction of the Registration Board or satisfies the Board that he/she has otherwise acquired an adequate knowledge of Nigeria building contract procedures.

2. The Society of Chartered Surveyors (2016)

Identifies that upholding ethical principles is a key reason why people rely on professional bodies. Competence and trust are central

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elements in generating confidence in the professions (The Society of Chartered Surveyors, 2021). Cartlidge (2019) argues that professions can only survive if the public retains confidence in them. Transparency and ethical behaviour are particularly important for quantity surveyors who are involved daily with financial transactions such as procurement, contractual arrangements, payments and valuations (Cartlidge, 2011).

3. Nema and Construction Standard

The National Environment Management Authority (NEMA) is a body established under the Environmental Management Act of the laws of Nigeria to exercise general supervision and coordination over all matters relating to the environment and to be the principal instrument of Government in the implementation of all policies relating to the environment. NEMA has the primary responsibility of implementing environmental safeguards, although many actors have responsibilities including civil society, private consulting firms, development banks which finance infrastructure and other government actors including local government and the court system. Currently, the system suffers from inadequate funding, corruption, a lack of engagement with important community stakeholders, gaps or duplications of regulations, and a misunderstanding by society at-large of the benefits of a sustainable and standard construction. These serious issues result in little oversight of development projects with potentially huge environmental impacts.

Development of the National Building Regulations

The Defunct National Council of Works and Housing, in 1987 directed that a National Building Regulations be evolved for Nigeria. All the stakeholders in the Building Industry were duly contacted for input at a National workshop at ASCON, Badagry - Lagos State in 1989 organized by the defunct Federal Ministry of Works and Housing. Another workshop was held at the Gateway Hotel, Ijebu-Ode, Ogun State in 1990 was approved by the then National Council on Housing in 1991, but was not ratified by the then Federal Executive Council for use in the Country.

The 1991 approved document was re-presented to the 2nd National Council on Housing and Urban Development held in Port-Harcourt, November, 2005 and the Council directed that the document be widely circulated to all stake holders for input to facilitate the production of an acceptable National Building Regulations.

The restructured draft document from three parts to four was completed in 2006 and signed as a National Building Regulations by the then Minister for Lands, Housing and Urban Development, Dr. Olusegun Mimiko with the hope that every tier of government, (federal, state and local) imbibe the spirit and intent of the Regulations and that State Governments

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integrate the provisions of the Regulations into their local laws and efficiently monitor the implementation of the Regulations.

The seven professions of the Building Industry and their respective Regulatory Bodies, i.e. Architecture, Building, Engineering, Estate Surveying and Valuation, Quantity Surveying, Surveying, and Urban and Regional Planning; contributed to the success of the production of the first edition of the National Building Code. (NBC, 2016)

Barriers to the Regulation of Construction Industry

Compliance with building regulations and laws is a legislative requisite in the construction industry (Windapo and Cattel, 2020). Notwithstanding this obligation, a growing body of literature suggests that the industry's regulation continues to emerge as one of the key challenges of achieving sustainable development.

A study of Mozambique's construction industry by Nhabinde. (2022) established that inadequate regulation was prompted by contractors who were not certified, insufficient policy and institutional coordination, and a lack of qualified personnel. These findings relate to that of Windapo and Cattel (2010) who argued that the South African construction industry had a skill and knowledge gap along with the fact that most supervisory positions were held by people who, although not well educated, were more experienced. As such, the extent of non-compliance with stipulated regulations was high amongst the unqualified and less experienced firms not registered with the country's Construction Industry Development Board. Further, some site managers were unaware of the legislation that regulate building construction industry. Regulation of the building construction industry may also be affected by noncompliance with approval conditions. For instance, Ngetich et al. (2014) found out that 38% of the applicants who obtained a development permit between 2005 and 2010 in Eldoret Town, Kenya, failed to comply with stipulated building regulations.

Above findings compares with that of by Hedidor and Bondinuba (2017) who averred that the informal construction sector in Ghana paid little attention to the approved regulations for the construction of buildings. This was elicited by low levels of training and competence of artisans within the industry. On account of inadequate regulation, low-quality training duped apprentices into thinking that they were fully qualified when they were not. In Mombasa, Kenya, Gacheru (2015) found out that barriers to the regulation of construction industry included the inadequate capacity by NCA to detect errant contractors through frequent surveys, weak enforcement of regulations, inadequate sensitization and poor attitude of contractors towards the regulatory bodies. According to

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Ofori-Kuragu (2016), key challenges to effective regulation of the construction industry in Ghana included lack of coordination and a clear agenda to address the apparent problems that afflict performance within the industry. As additionally corroborated by Hedidor and Bondinuba (2017), the country lacked a multi-stakeholder representative body that could provide leadership in the pursuit of reforms in the Ghanaian construction industry. In their research, Callistus et al (2014) through a case study of small- scale contractors in Ghana demonstrated that some of the barriers to effective regulation of the industry were corruption, lack of coordination between designers and contractors, inadequate monitoring and feedback by relevant authorities, and lack of training on quality for staff.

In an attempt to further investigate compliance and enforcement challenges concerning the national building regulations process in South Africa, Twum-Darko and Mazibuko (2015) established that developers had a low level of awareness and understanding of the regulatory role of implementation of National Building Regulations. Other challenges included ineffective communication channels between the stakeholders and the regulator and also inconsistencies of the enforcement of the legislation by various local authorities.

A further study by Kumar and Pushplata (2015) on compliance with building regulations for the hill towns of India demonstrated that the enforcement and surveillance mechanism to ensure compliance was not adequate. Given this, there were fewer initiatives by regulatory authorities in an attempt to stop illegal and unplanned developments. Moreover, there was a shortage of technical experts in hill towns who could implement existing building regulations in addition to ensuring that construction activities were carried out in compliance with the approved regulations. These findings are further corroborated by Adebowale et al. (2016), who established that a key challenge within Nigeria's construction industry included poor workmanship and inadequate supervision. In this case, supervision should constantly aim to ensure that building developments are undertaken as approved by planning by authorities.

From the preceding literature review, key barriers to effective regulation of the construction industry may be summarized to include insufficient coordination, lack of qualified staff within firms, inadequate capacity by regulatory authorities, inadequate enforcement and surveillance, and lack of stakeholders' sensitization. The current study, however, examines the statistical relationship between key barriers that influence effective regulation of the construction industry.

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Theoretical Framework Transformation theory

In the construction system, production takes inputs in the form of labour, materials, finance, information, plants and equipment, and converts them into the expected services and products, otherwise known as outputs. The principles of a classical transformation include (i) the division of production into smaller controllable sub-processes and further into tasks, then making available all the inputs required for a particular work section and then allocating these tasks to workers; (ii) the reduction of the project cost by minimizing each cost of the sub process; and (iii) linking of the input value of a process with the output value (Gao, 2023). In practice, the value of a finished building can be increased using skilled labour, better materials and effective task management (Gao, 2023). This theory is particularly relevant to BPM because it explains the need to define works required to deliver a construction project, which helps to avoid unnecessary efforts.

Flow theory

According to Koskela (1999), flow processes include inspection, waiting, and moving, which represent waste (non-transformation activities) in production. As outlined by Gao (2013), the principles behind flow processes include (i) the reduction of activities that add no value; (ii) the reduction of lead time and variability; and (iii) simplicity, increased flexibility and transparency. The flow theory seeks to manage and continuously improve production, by making sure that unnecessary works are reduced to the barest minimum (Koskela, 2019). The sources of activities that add no value (waste) are (i) the production system structure; (ii) the production control style; and (iii) the characteristic nature of various phases in production, such as design, control and advancement of production (Gao, 2023).

Research Design

The survey research design was used for the study. According to Left Wich (2013), a survey research is that type of study in which a sample is selected randomly from the study population and studied, and the results are used to make generalization on the matter investigated. Thus, the researcher considered this design appropriate because original data from the respondents will be collected and analysed and it will be generalized to be representative of the entire population.

Population for the Study

Population is defined as the total collection of elements about which we wish to make inferences (Cooper & Schindler, 2023). Mugenda and Mugenda, (2023), explain that the target population should have some observable characteristics, to which the researcher intends to generalize the results of the study. The researcher narrowed the sample observation to consultants, contractors and clients in Enugu

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urban for feasibility reasons, the target population of this study shall be 200 registered contractors in Enugu urban, 75 consultants and 400 clients, which summed up to 675 respondents.

Sample and Sampling Techniques

A sample size was determined from a total population of 675 respondents using the Nauom (2017). Stratified random sampling technique was used to select the respondents. Stratified random sampling technique ensures that different groups of a population are adequately represented in the sample. In this section of sampling design, the researcher mainly strategies related to sampling techniques for easy access to right data from respondents. The process of deriving the sample and the technique used is referred to as sampling technique A scientific means or statistical tools where used to determine the sample size of the study. Nauom (2017) used this formula for finite population as

$$n = \frac{N}{1 + N(e)^2}$$

Where: n= Desired sample size N= the entire population e= level of significance or limit of tolerable error assumed to be 5% or 0.05
I= unit, constant figure Therefore:
For contractors

$$N = \frac{N}{1+N(e)_2}$$

$$n = \frac{50}{1+50(0.05)^2} \quad n = \frac{50}{1+50(0.0025)}$$

n= 44 For clients

$$N = \frac{N}{1+N(e)_2}$$

$$n = \frac{100}{1+100(0.05)^2} \quad n = \frac{100}{1+100(0.0025)}$$

n= 80
For Consultant

$$N = \frac{N}{1+N(e)_2}$$

$$n = \frac{45}{1+45(0.05)^2} \quad n = \frac{45}{1+45(0.0025)}$$

n= 40

Table 3.2 Estimated Population Distribution and Sample Size of the Study

S/N	CATEGORIES OF RESPONDENTS	ESTIMATED POPULATION	SAMPLE SIZE
1.	Contractor	50	44
2.	Client/public	100	80
3.	Engineers	45	40
	TOTAL	**195**	**164**

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Source: Field Survey (2019).

Sources of Data Collection

The study is based on both primary and secondary data. Both primary and secondary data was collected for the present study.

Primary data: The primary data for the study was collected through the following methods and techniques. It is often undertaken after the researcher has gained some insight into the issue by reviewing secondary research or by analyzing previously collected primary data like data collected for pilot study.

Secondary data: Secondary data is information that has already been collected and analyzed by other researchers for academic and other purposes. Secondary data was gathered from various sources namely, conferences papers, text books and journals articles.

Instrument for Data Collection

The instrument used for data collection was structured questionnaire and was constructed by the researcher. The questionnaire consists of two sections. Section A will be concerned with personal information of the respondents while section B will be concerned with actual data needed for the study. The items were drawn from the research questions that guided the study. Each item has response options to be picked by the respondents with numerical values assigned to them the options are options.

Response options		values
Very good	(VG) ____	(4)
Good	(V) ____	(3)
Fair	(F) ____	(2)
Poor	(P) ____	(1)

Validation of the Instrument corporate

The researcher's supervisor and other experts in the department will validate the instrument to determine the suitability of the items of the questionnaire. This will be done by presenting draft copies of the questionnaire to the supervisor and experienced lecturers in the department after which the researcher will incorporate the corrections. The validity of data instrument is the approach used to administer questionnaires on personnel and personal. Based on their comments, modifications and suggestions, the final draft of the instrument will be produced and used for the study.

Reliability of the Instrument

The reliability of the instrument was established using Cronbach alpha. The instrument was administered to the selected respondents. The results obtained from the analysis of their response were used in computing the reliability of the instrument. The reliability was computed using a statistical package for social science (SPSS) the result obtained from the reliability was 0.704. This the researcher regarded as high enough to be used for the study.

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Method of Data Collection

Copies of questionnaire were administered to collect qualitative and quantitative data.

Method of Data Analysis

The data collected through structured questionnaire was analyzed using spss statistical package which was turned to tables and simple percentage approach.

PRESENTATION AND ANALYSIS OF DATA

The data collected for this study were statistically analysed and presented based on the research questions that guided the study in this chapter.

Out of the one hundred and sixty four (164) questionnaire distributed, one hundred and thirty five questionnaire were correctly filled and returned.

Research question one

What are the roles of professional builders in the implementation and enforcement of building regulations in Nigeria?

Table 1. *Responses of the respondents on the roles of professional builders in the implementation and enforcement of building regulations in Nigeria*

S/N								
		VGE	GE	LE	VLE	∑FX	$\bar{X}$	RESULT
1	Ensuring that the guiding principles of national building regulations are strictly followed.	45	50	23	17	135		
		180	150	46	17	393	2.9	ACCEPT
2	To ensure that adequate sanction are meted out to the offenders	50	49	30	6	135		
		200	147	60	6	413	3.0	ACCEPT
3	To ensure that there is no violation of the regulations	47	53	33	2	135		
		188	159	66	2	415	3.0	ACCEPT
4	To ensure that the national building regulations becomes effective and operational amongst builder.	40	55	30	10	135		
		160	165	60	10	395	2.9	ACCEPT

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	Grand total						2.9	ACCEPT

Four questionnaire items were used to answer research question one. All the items had mean ratings above 2.5 The grand mean rating was 2.9 which is also above the criterion mean. Based on this, the researcher concludes that the listed items are the roles of professional builders in the implementation and enforcement of national building regulations.

Research question two

What are the level of violation and compliance of building regulations in Nigeria building industry?

Table 2. Responses from the respondents on the level of violation of building regulations

S/N	**Responses on the level of violation of building regulations**							
		VGE	**GE**	**LE**	**VLE**	**∑FX**	$\bar{X}$	**RESULT**
5	Most engineers do not adhere to the guiding principles of national building regulations	45	51	20	19	135		
		180	153	40	19	392	2.9	ACCEPT
6	National building regulations has been grossly neglected by the builders	49	30	42	14	135		
		196	90	84	14	384	2.8	ACCEPT
7	Some of the building engineers are ignorant of the building regulations	46	43	20	26	135		
		184	129	40	26	379	2.8	ACCEPT

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8	The level of violation of the building regulations in the Nigerian building industry is very high.	41	39	34	21	135		
		164	117	68	21	370	2.7	ACCEPT
	Grand total						2.8	ACCEPT

Four questionnaire items were used to answer research question two. All the items had mean ratings above 2.5. The grand mean rating was 2.8 which is also above the criterion mean. Based on this, the researcher concludes that the level of violation of building regulations in the Nigeria building industry is very high.

Conclusion

From the findings of the study, the researcher concludes that the roles of professional builders in the implementation and enforcement of national building regulations includes ensuring that the guiding principles of national building regulations are strictly followed, ensure that adequate sanction are meted out to the offenders, ensure that there is no violation of the regulations, ensure that the national building regulations becomes effective and operational amongst engineers.

Recommendations

Based on the findings of the study, the following recommendations were made;

1. There is need for relevant authorities to enforce rules on the implementation and enforcement of national building regulations so as to reduce the rate of building collapse and building abandonment in Nigeria and Enugu state in particular.
2. Adequate sanction and fine is expected to melted to the offenders which will stand as deterrent factors against such act. The fine can range from revoking of the operational license and certificate.
3. There is need for government to step towards enforcing the rules of observing the national building regulations in order to prevent building collapse.

Suggestion for further studies

The following areas are suggested for the further research 1. Challenges of enforcing the national building regulations.

2. A similar study of cross-sectional nature could be conducted among inter-school in other local government area.

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