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Building Industry Professionals' Attitude Towards Construction and Demolition Waste Disposal on Building Projects in Lagos Metropolis, Nigeria

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Abstract

Globally, the construction industry has a significant detrimental impact on the environment. Building construction is one of the vital human activities that deplete nature's resources within the environment. Cities are currently undergoing a period of fast economic expansion, urbanization, and migration, increasing construction activities to accommodate the burgeoning population, resulting in high construction and demolition waste (C&D). The Building Industry Professionals (BIPs) have become an indispensable part of nation-building in response to sustainably engaging the environment. This study assessed the attitude of Building Industry Professionals toward construction and demolition waste disposal to stimulate best practices in protecting the environment. A quantitative approach was used randomly in the selection of 180 BIP, Architects, Engineers, Builders, and Quantity surveyors. The result showed 63.3% of the BIPs are not involved in C& D waste disposal while 36.7% were partially involved. Also, 72% of the BIPs' had a nonchalant attitude to waste disposal as it is left in the hand of another service provider. It is therefore recommended that the BIPs should be made to be involved in C & D waste disposal and tracking.

Keywords: *Building Industry Professionals, Construction & Demolition waste, Sustainable environment.*

1.0 Introduction

Building construction operations are one of man's most influential actions on natural resources and the environment, and the processes involved in construction have significant negative environmental effects (Wu et al., 2017). The current environmental difficulties in the building sector are serious and it has gained the researcher's attention because it also consumes the largest energy and resources thereby depleting the environment to the point that environmental sustainability is no longer possible (Bao & Lu, 2020; Wang et al., 2010). Horsley, (2003) opined that the raw materials extraction and processing during construction activities leads to the evolution of the building process over a range of periods (i.e from the start of the construction process, during building operations, and until the building is eventually demolished after its useful life) generates waste and this view of e-construction to waste cycle is supported by Rahim et al., (2017). Other researchers considering how to reduce material extraction and energy depletion have promoted reuse and recycling activities (Kabirifar et al., 2020; State & Engineering, 2019). A proper C & D waste management plan will enhance and promote a sustainable environment due to re-use and recycling activities which in turn preserve the amount of material extraction from the earth and reduce energy demand to process and manufacture new materials (Narcis et al., 2019; Tam & Lu, 2016).

Despite the global financial crises, the demand for housing, and industrial and cultural buildings keep rising and each year the world population in cities keeps growing. This necessitates the need for more housing construction provisions. The developing cities cannot but generate and dispose of construction and demolition waste with attendant impact on the environment (Aleksanin, 2018).

C & D waste and its environmental impacts in a particular region are no longer a local issue but a global concern that requires the attention of all stakeholders in the building construction industry.

Therefore, managers of construction sites play a key role in the overall management of waste which includes; the collection to disposal of all waste on the site. Against this backdrop, this paper aimed at assessing the attitude of Building Industry Professionals (BIPs) toward construction and demolition waste disposal to stimulate best practices in protecting the environment. The following objectives were considered; assessment of the demographic characteristics of the BIPs in the study conducted, assess the existing construction and demolition waste disposal methods in Lagos metropolis, examine the involvement of BIPs in waste disposal in Lagos metropolis and evaluate the BIPs' attitude towards waste disposal in Lagos metropolis.

2.0 Review of literature

2.1 Building Industry Professionals

The building construction industry contributes significantly to the nation's economy because it employs between 2 and 10% of the workforce of most countries (Tamiz Uddin et al., 2021). Encarta Dictionaries defined a profession as an occupation requiring extensive education i.e. an occupation that requires extensive education or specialized training. The profession is a skilled occupation, usually, one requiring specific education, training, knowledge or experience (Abdul-Rahman. et al., 2010). Nigeria had gained impressive economic growth during the last three decades. It is expected that the building industry should raise professional standards which involve the exercising of the body of unique, expert knowledge which is always been linked with the notion of "service" so that a professional is described as a group of people organised to serve a body of specialized knowledge in the interests of society based on the perceived relationship (Adams et al., 2017). Ghaffar et al., (2020) stated that a professional is automatically tied up with more practical concepts and expectations from the public, encompassing issues such as competence, responsibility and willingness to serve the public (Bao & Lu, 2020).

2.2 Construction & Demolition waste

The solid waste generated in the building and construction industries is referred to as construction and demolition waste (CDW) (Vergara & Tchobanoglous, 2012; Wu et al., 2017). Bao & Lu, (2020) in his description asserted that demolition waste is waste generated from demolished structures while construction waste, is waste generated as a result of the process of construction and renovation of buildings. CDW is generated from the construction, renovation, and demolition operations such as civil works, site clearance, road construction, land excavation or grading, and demolition activities (Wang et al., 2014).

2.3 Sustainable environment

Environmental sustainability is responsible for the conservation of natural resources and the protection of global ecosystems to support health and well-being, now and in the future (Samuel et al., 2020). It is now advisable that waste management should involve a procedure in which waste production is controlled and minimized by expert to achieve sustainable construction waste management practices. The challenges of waste management is in line with the tasks of protecting the hydrosphere and the atmosphere from pollution, and issues of conservation of biological and land resources (Huang et al., 2018).

2.4 Waste management

Waste management encompasses all human efforts, including the storage, collection, transportation, recovery, processing, and disposal of all substances or materials no longer required by the original generator (Oni et al., 2018). The storage, collection, transportation, recovery, processing, and disposal of any substances or materials that the original producer is no longer in need of constitutes all human efforts under the heading of waste management (Oni et al., 2018). This process of waste management can be defined as human behaviours such as designing, planning, organizing, staffing, leading or directing, and regulating an organization or system to achieve a set of objectives. These set objectives may include reduction of the negative impact of waste on human health, prevention of air, land and water contamination to engage in continuous improvement of the aesthetic value of the environment and finally recover resources for further usage (Wu et al., 2022).

3.0 Methodology

Lagos State was reported to have a landmass of 2797.72 Km^2 and a water area of 779.56 Km^2 and a population density of approximately 4,193 persons per km^2 as well as a landmass of 1,171.28km^2 with an average population density of over 20,000 persons per km^2 (BudgIT, 2018). Presently, the state is experiencing a daily influx of people as they attempt to take the advantage of multiple industries, massive commercial activities and technological advancements to seek employment in the highly competitive labour market of Nigeria.

Figure 2: Map of Metropolitan Lagos State Showing the 16 Local Government Areas.
Source: http://www.nigerianmuse.com/20100527092749zg/sections/pictures-maps-cartoons/maps-of-various-states-and-their-local-governments-in-nigeria.

This study examined 180 building industry professionals (BIPs) who were active members of their professional associations in Lagos using a quantitative sample technique. These BIPs sampled are professionals from several industry stakeholders include architects, builders, engineers, quantity surveyors and others in one category. The BIPs in question are licensed professionals who have

worked on projects in Lagos and maintain offices there. Descriptive statistics were used to examine and show the data.

4.0 Discussion of findings

This study showed 180 BIPs respondent with 33.3% as Architects, 8.3% Builders, 31.5% as Engineers, 24.9% as Quantity Surveyors and other category of professionals as 2.0% as shown in table 1.

Table 1: Showing demographic characteristics of the BIPs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Architect	60	33.3	33.3	33.3
	Builder	15	8.3	8.3	41.6
	Engineer	57	31.5	31.5	73.1
	Quantity Surveyor	45	24.9	24.9	98.0
	Others	3	2.0	2.0	100.0
	Total	180	100.0	100.0	

Source: Author fieldwork 2022

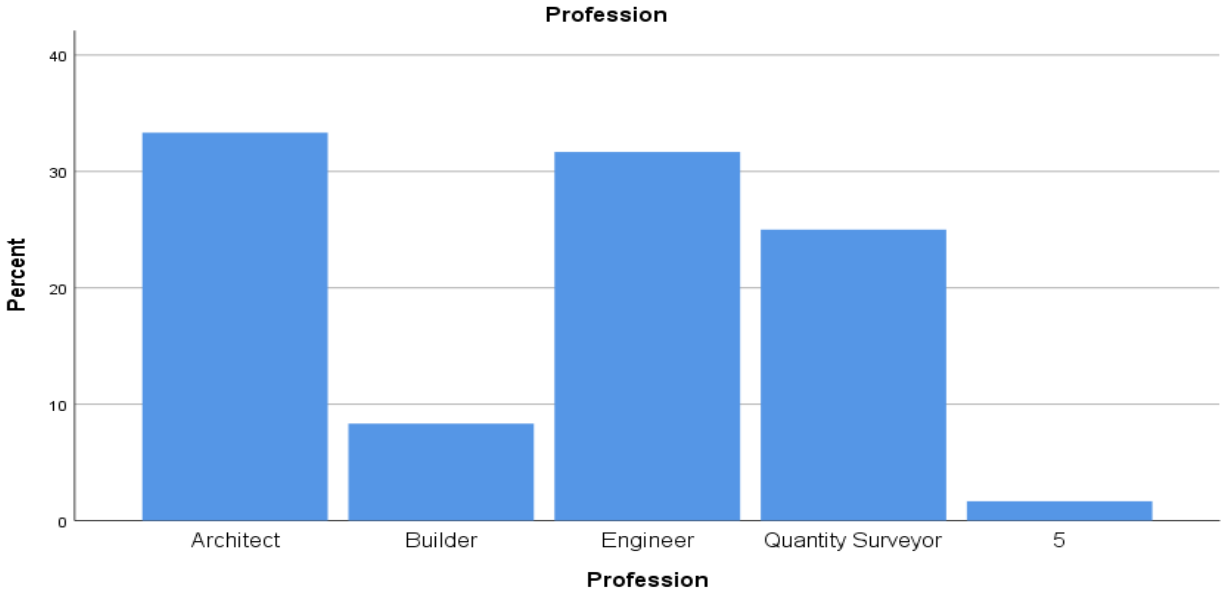

Fig.1 Showing the graphical representation of BIPs
Source: Authors field work.

From objective 2, assessing the existing construction and demolition waste disposal methods in Lagos metropolis, the result show that the landfill receives about 11.0% of C& D waste generated while another 11.0% of the waste are re-used as backfill, majorly 19.3% are stocked pilled, burning and incineration account for 19.4% disposed of.

Table 2: Showing how C & D waste are disposed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		6	3.3	3.3	3.3
	Landfill	20	11.0	11.0	14.4
	1, 2, 4, 5	8	4.4	4.4	18.8
	1, 2, 4, 6	5	2.8	2.8	21.5
	1, 2, 6	5	2.8	2.8	24.3
	1, 4, 6	5	2.8	2.8	27.1
	1, 6	6	3.3	3.3	30.4
	Re-use as backfill	20	11.0	11.0	41.4
	2, 3	5	2.8	2.8	44.2
	2, 5	5	2.8	2.8	47.0
	Recycle	16	8.8	8.8	55.8
	Stock pilled	35	19.3	19.3	75.1
	4, 5, 6	5	2.8	2.8	77.9
	Incineration	5	2.8	2.8	80.7
	Burning	30	16.6	16.6	97.2
	Others	5	2.8	2.8	100.0
	Total	180	100.0	100.0	

Source: Author fieldwork 2022

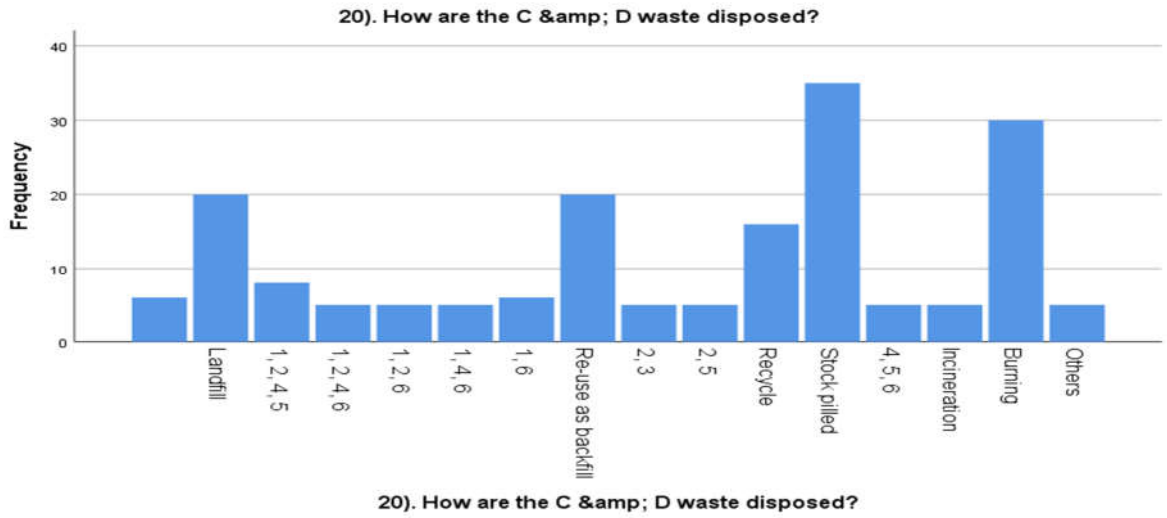

Fig.2: Showing how C & D waste are disposed.
Source: Author fieldwork 2022

Table 3. What constitute majorly to the waste generation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	.6	.6	.6
	Insufficient drawing details	10	5.5	5.5	6.1
	1, 2, 3, 4, 5	5	2.8	2.8	8.8
	1, 2, 3, 5	5	2.8	2.8	11.6
	1, 3	1	.6	.6	12.2
	1, 3, 4	23	12.7	12.7	24.9
	1, 3, 6	5	2.8	2.8	27.6
	Lack of BIM implementation	10	5.5	5.5	33.1
	2, 3, 5	5	2.8	2.8	35.9
	2, 4, 5	5	2.8	2.8	38.7
	Irrational design changes	35	19.3	19.3	58.0
	3, 4	6	3.3	3.3	61.3
	3, 5	5	2.8	2.8	64.1
	3, 5, 6	5	2.8	2.8	66.9
	Supply of substandard materials	20	11.0	11.0	77.9
	4, 5	5	2.8	2.8	80.7
	Inadequate off-site construction detail in design phase	15	8.3	8.3	89.0
	Others	20	11.0	11.0	100.0
	Total	181	100.0	100.0	

Source: Authors' fieldwork 2022

In response to objective 3, which is to examine the involvement of BIPs in waste disposal in Lagos metropolis it was found out that out of the 180 respondents, 36.7% were partially involved in waste management while the remaining 63.3% are not involved, in other words, no one is taking full responsibility for C&D waste management as shown in table 3. Which showed that the BIPs were not fully involved in the disposal of waste rather C & D waste is left with other informal sectors.

Table 3 : Building Industry Professionals Involvement in waste

BIPs Involvement in waste disposal	Frequency	Percentage (%)
Partially involved	66	36.7
Not involved	114	63.3
Total	180	100.0

Source: Authors' fieldwork 2022

This same result agreed with Samuel et al., (2020) who stated that C&D waste management is still evolving, only a few multinational construction companies can treat or recycle their C&D waste, majority of the construction waste generated is still at the elementary level and is currently being undertaken on an informal basis.

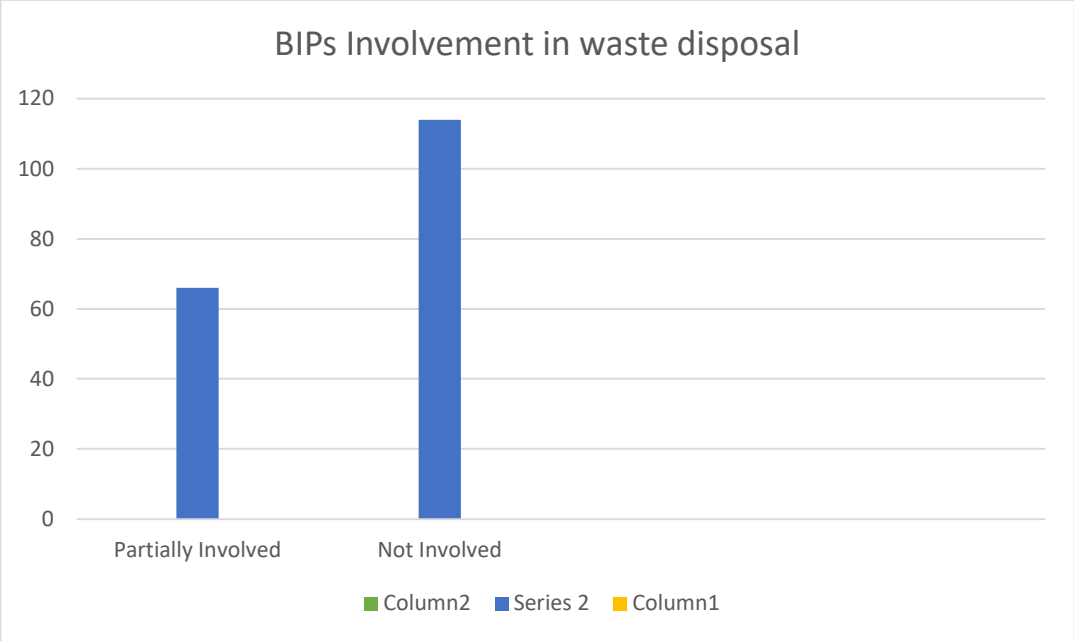

Fig.3 Showing BIPs Involvement in waste disposal.

Evaluation of BIPs' altitude towards waste disposal in Lagos metropolis, result showed that the need for site workers enlightenment account for 24.9%, 5.5% want government intervention in the awareness exercise of C & D waste disposal, while others required formulated policies and incentives for better C & D awareness.

Table 4: Showing how C & D awareness be enhanced.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		6	3.3	3.3	3.3
	Site workers enlightenment	45	24.9	24.9	28.2
	1, 2, 3, 4	5	2.8	2.8	30.9
	1, 2, 3, 4, 5	18	9.9	9.9	40.9
	1, 2, 3, 4, 5, 6	5	2.8	2.8	43.6
	1, 2, 3, 5	5	2.8	2.8	46.4
	1, 2, 4	5	2.8	2.8	49.2
	1, 3	5	2.8	2.8	51.9
	1, 3, 4, 5	11	6.1	6.1	58.0
	1, 3, 5	10	5.5	5.5	63.5
	1, 3, 6	5	2.8	2.8	66.3
	1, 4	5	2.8	2.8	69.1
	1, 4, 5	20	11.0	11.0	80.1
	1, 5	1	.6	.6	80.7
	Government intervention required	10	5.5	5.5	86.2
	Formation and implementation of realistic policies	5	2.8	2.8	89.0
	Incentives and reward for compliance	10	5.5	5.5	94.5
	Others	10	5.5	5.5	100.0
	Total	180	100.0	100.0	

Source: Authors' fieldwork 2022

5.0 Conclusion and Recommendations

This study aimed assessing the attitude of Building Industry Professionals (BIPs) towards construction and demolition waste disposal to stimulate best practices in protecting the environment in Lagos, Nigeria. Three distinctive conclusions were derived from the findings. The first conclusion is that the majority of the construction and demolition waste are burned and incinerated on site which is detrimental to environmental preservation since waste management have not been given necessary attention in Nigeria. The second one is that most of the participants involved in this study have not been involved in handling construction waste, instead, they prefer that another contractor handle this aspect of work for them. Lastly, despite the non-effective disposal method of construction and demolition waste, evacuation of wastes is often done on most construction sites in Lagos state it is however, required that there should be enlightenment, government policy and incentives to improve the level of awareness for a positive attitude of all BIPs in the building construction industry. It is therefore recommended that burning of construction waste be discouraged by providing alternative methods to preserve the environment. Also, policies to get BIPs involving waste disposal should be implemented from point of generation to disposal and finally enlightenment and incentives should be given to sites in total compliance to waste disposal methods that encourage environmental sustainability.

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