



Challenges of Material Wastages on Construction Outputs in Lagos State

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ABSTRACT

The study is focused on the challenges of material wastages on the outputs of construction industry in Lagos State, Nigeria. In order to achieve the stated aim, the study understudy causes of materials wastage on construction sites in Nigeria, the effects on the projects' output and determine the mitigating measure to reduce material wastages on the construction sites in Lagos State. The study adopted a primary data source through administration of questionnaires. A total of Seventy (70) questionnaires were administered on ten (10) selected construction sites in Lagos state, Nigeria through a purposive sampling technique, fifty (50) of the seventy (70) administered questionnaires were retrieved and found fit for analysis of the study, representing 71.4% response rate. Data collected for the studies were analyzed using relative important index (R.I.I). Findings revealed that wastages occur mostly on sites during storage and handling of materials and this has negative effect on both the client's budget and contractor's profit. It was concluded that wastages of materials frequently occur on sites from different sources and also that the level of wastages on construction sites is high during construction. The study recommended that only certified construction professionals should be employed in carrying out construction so as to reduce material wastages during construction, and that waste management should be incorporated into the curriculum of building and civil engineering students in tertiary institutions. Government are also advised to prioritize technological development for effective management and control of materials to be guaranteed in construction activities.

Keywords: Construction-Sites, Management, Materials, Wastages

INTRODUCTION

Construction site is subsisted with unsolicited materials obtained from the left over, surplus or unused items / materials during construction. This includes building materials such as mortar, gravels , granites , woods , asbestos, roof covering, peels, nails, electrical wires, as well as waste originating from cutting and fixing of materials such as dredging materials, tree stumps, and rubble. Construction waste may contain injurious and other hazardous substance which are dangerous to human health.

According to Chadrick (1982), materials formed one of the most relevant resources required for construction, and constitute 51% of the project cost. His study affirmed that not all the materials procured and delivered to site are utilized for construction. Material wastes during construction include rubbles, nails, woods, asbestos, broken tiles, roof coverings, unused gravel, granites, and mortar among others. Studies showed that 10% -15% of the materials actually required for construction go into wastages during construction, which is much higher than the usual provision of between 2.5% - 5% by the Quantity Surveyors. Construction site accommodates varieties of operations hence there is need for control of material wastages to reduce cumulative construction cost.

It is however the practice of Government or local authorities to enact a law which guide on the haulage and treatment of waste on construction sites, this is to ensure adequate provision for proper handling and disposal of toxic elements and radioactive materials which could pose danger to human health if not properly disposed to a designated heap. This connotes that safety guidelines and restriction has to be adhered before such action is carried out by the contractor.

Wahab and Alake (2007) stated that the country was filled with low level construction in the first decade after independence, which was later precipitated by modern construction restricted to urban cities only , being the seat of government during the 1967-1970 civil war. Effective waste management is essential on construction site due to the fact that the cost of storage and transporting construction waste to a designated dumping site is cheaper than the danger and risks that could arise from leaving the waste on site (Akinkulolere and Franklin , 2006).

Materials being one of the major component employed by the construction industry undergo series of processes before its usage on site, however, this connotes that the quantities and volume of material delivered to site cannot be completely used for the purpose it was ordered due to numbers of factors such as damages, theft, shrinkages among others. All these excessive loss of materials are referred to as waste. Materials wastage isn't extra cost as it is envisaged during the documentary stage of the project. Building research establishment classifies material's wastage as design wastage and ordering

waste. Wahab and Lawal (2011) claimed that waste is inherent in construction and that waste are generally incurred during planning, estimating and construction stage.

According to (Ekanayake and Ofori, 2000), waste cannot be totally eliminated in construction as it indirectly comes up during design, operation, procurement and material handling. Waste has a sizable effects on the productivity, material and completion time of project which results in loss of a significant amount of revenue. The effect of waste of resources while embarking on construction cannot be overemphasized. Every items of work to be carried out on construction has specific quantified amount of material required, and any attempt to use more than specified quantities constitute a waste, and invariably results into loss in contractor's profit (Wahab and Alake, 2007). A study on waste management by (Chandrakanthi et.al., 2002) opines that greater proportion of municipality waste is traceable to construction, so its reduction becomes necessitated. The waste generated by construction companies can be used as landfill during road works and filling for other construction. Akindoyeni (1989) opined that waste can be drastically reduced in construction if the designer reckons well with the specification at the design stage of the construction. The study however concluded that this will not only reduce waste but also minimize variation cost on the project. Previous researchers have identified that emergence of waste in construction is inherent but very few studies have since been made on the core challenges of these wastages on the final construction outputs hence the need for this study.

METHODOLOGY

The study adopted primary data source and the research design for this work is structured basically on a survey method in order to achieve quantitative information from the targeted population. The instrument used for the survey is structured questionnaire which was designed to collect data for the stated research objectives. The purposive sampling technique, in which every sampled respondents were perceived to have better understanding of the subject matter and also capacity to supply reliable information for the data was adopted during the administration of the questionnaire. A total of seventy (70) questionnaires were administered on ten selected construction firms in Lagos State Nigeria, through a purposive sampling technique. Seven (7) questionnaires were administered on each of the ten (10) selected construction firms. Fifty (50) of the administered questionnaires were successfully retrieved and found fit for analysis of the study, representing 71.4% response rate. The questionnaire was designed in two sections. Section A provides demographic information of the respondents, while section B is focused on the objectives of the study; To identify factors responsible for wastage of materials on construction sites ; To examine the effect of waste on construction activities; To suggest mitigating measures to reduce wastages in construction activities in the study area. The study adopted a five point likerts scale in hierarchical order. The data retrieved were analyzed using percentages, relative importance index and mean score from the statistical package for social scientists (SPSS) version 20.

Results, Data Analysis and Discussion of findings

The data obtained from the returned questionnaires were analyzed using Statistical Package for Social Science (SPSS) version 20.0. The study employed the use of descriptive statistics which includes frequency distribution tables, percentages and mean score.

Table 1 : Demographic Information of Respondents

Personal Information		Percentage
Sex		
Male	47	94.0
Female	3	6.0
Professional Background		
Architect	2	4.0
Builder	31	62.0
Civil Engineer	12	24.0
Estate Surveyors and Valuer	0	0.0
Quantity Surveying	5	10.0
Academic Qualification Attained		
ND/HND	29	58.0
BSC/BTECH	16	32.0
MSC/MBA/MPM	5	10.0
PHD	0	0.0
Professional Qualification		
NIA	2	4.0
NIOB	17	34.4
NSE	9	18.0
NIQS	4	8.0
NIESV	0	0.0
NONE	18	36.0
Years of Experience		
1 – 5 years	0	0.0
6 – 10 years	4	8.0

11 –15years	19	38.0
16 – 20years	16	32.0
20 years above	11	22.0

Table 1 above represents the Demographic information of the respondents, and it could be observed from the Table 1 that the respondents are majorly construction professionals who would give a reliable data for the study. 2 of the respondents were Architect, 31 were Builders, 12 were Civil Engineers, while the remaining 5 respondents were Quantity Surveyors. Table 1 also depicts that greater percentage of the respondents possess 11-20 years of experience, with none of them having less than 5 years of working experience. This validates the reliability of the data collected for the study.

Table 2: Major Causes of Material Wastage on Construction Site

FACTORS	R.II	RANK
Re-work resulting from workers' blunder	0.1028	1 st
Inadequate supervision	0.0982	2 nd
Adopting wrong construction method	0.0888	3 rd
Use of incorrect materials	0.0860	4 th
Lack of onsite control	0.0766	5 th
Selection of substandard products	0.0766	5 th
Wrong perception of work	0.0708	7 rd
Unfavorable weather condition	0.0644	8 th
Design changes and variations	0.0624	9 th

Source: Field Survey, 2023.

Table 2 indicates major factors responsible for material wastages on construction sites, and it can be seen that 'Rework resulting from workers' blunder', inadequate supervision, and adopting wrong construction method were ranked first, second and third with relative importance index of 0.1028, 0.0982, and 0.0888 respectively.

Table 3: Effects of Material Wastages on Construction Output

EFFECTS	MEAN SCORE	RANK
High Construction Cost	3.20	1
Reduction in Contractor's Profit	2.99	2
Possible rise in Contract sum	2.78	3
Possibility of fluctuation	2.60	4
Project Abandonment	2.60	4
Project Delay	2.59	6
Disputes between Main contractor and Subcontractor	2.54	7
Disputes between Client and Contractor	2.51	8
Loss of Reputation	2.49	9
Variation	2.44	10

Table 3 highlights the effects of material wastages on construction output, and it was observed that the major effects of material wastages were high construction cost, reduction in contractor's profit and Possible rise in contract sum with mean score of 3.20, 2.99, and 2.78 respectively.

Table 4: Methods of Reducing Material Wastages on Construction Site

Methods	Mean Score	Ranking
Using Experienced Workers on site	4.10	1
Effective Training and Knowledge Acquisition	3.87	2
Effective project management techniques	3.70	3
Using the right materials	3.62	4
Technology Advancement	3.60	5
Re-using existing materials	3.56	6
Ensuring effective communication on site	3.44	7
Segregating waste efficiently	3.23	8
Avoiding ambiguities and mistakes	3.11	9

Source: Field Survey, 2023.

Table 4 above shows various method that could be adopted to reduce the material wastages on construction site. The study found out that the following methods are best employed in other to reduce the menace of material wastages, and these include: Using Experienced workers on site, Effective training

and knowledge acquisition, adopting effective project management techniques and using the right materials with corresponding mean score of 4.10, 3.87, 3.70, and 3.62.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The study concluded that material wastages is inherent on construction sites, and has negative effects on both the clients and the contractors. Similarly, it was concluded that material wastages frequently occur in construction sites through various sources which include among others: Construction, Handling, Cutting and fixing, Storage, Theft, etc.

Recommendations

The study however recommended the following measures in other to reduce material wastages on construction in general. These include:

- Only certified construction professionals should be employed to work on site
- Sensitization and regular training to be introduced to construction workers on effective material management on site, this will invariably reduce material wastages on construction site and thereby not only saves time but also increase contractor's profit.
- The contractors should be charged to use the right materials from the onset of the project till the completion period.
- The contractors are mandated to be clear on the specified instructions before embarking on any exercise on the project.
- Re-using of some materials e.g. excavated materials are encouraged to reduce the transportation cost and also cost of disposal of such items.

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