

Assessment of Building Construction Materials at Manufacturing Industries in Nigeria

Taiwo Gabriel¹ and Adeiza Muazu²

¹Research Scholar, Department of Civil Engineering, Adekunle Ajasin University, Akungba Akoko, Ondo State, Nigeria

²Assistant Professor, Department of Civil Engineering, Adekunle Ajasin University, Akungba Akoko, Ondo State, Nigeria

¹Corresponding Author: taiwo.gabriel1123@aaua.edu.ng

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ABSTRACT

To complete a construction project successfully, you'll need a good project control system. To ensure any chance of success, projects of significant size or complexity must be constantly managed. Control standards are used by the project team to ensure that progress is kept at acceptable levels. The purpose of the research is to look into material control in the Nigerian construction industry. The study's goal was to summarize what was already known about material control in construction production. The information was gathered by distributing a standardized questionnaire to experienced experts on building locations and in workplaces. The results demonstrate that 60 percent of the locations employ material preparation to control materials, with quantity surveyors performing the majority of the control planning. The way building materials are created and controlled has problems such as lack of planning, , improper storage, late delivery of components to the job site, and poor material testing. The construction business ought to have a document established for controlling building materials; programme material control education should be undertaken, and the three basic techniques (scheduling, material planning, and ABC analysis) should be incorporated into controlling materials.

Keywords: construction, material, industries, resources, planning

I. INTRODUCTION

The environmental impact of the materials and building processes employed must be addressed. Throughout their lifecycles, starting with the purchase of raw materials through disposal of waste, the environmental effects of construction materials, goods, and services have attracted a lot of attention. Materials, and their selection, were the method of design invention compatibility, and ability to adapt to the tools dictated whether you succeed or fail; the construction was made of materials, and this mindset now applies to our material selection. When the designer's materials are handed over to production for ordering and then received on site, they become the design's tangible manifestation. Modern construction material failure can be linked back to a lack of attention to how the chosen materials must be handled, manipulated, built, and maintained.

The time spent selecting materials caused the least amount of time and expense overrun. The analysis of residential projects was both delayed and more expensive as a result of devoting less than two months to the selection of construction materials. Residential project delays and cost overruns were also influenced by the materials used in their construction. It took less time and money to build a project with imported materials than a project made with local or mixed-up local and imported parts. This conclusion, however, is in line with anticipation because who are business owners and contractors wish to employ imported parts need make sure they can get them before the construction phase begins.

The successful completion of a construction project requires a well-functioning project control system. To ensure any chance of success, projects of significant size or complexity must be handled on a continuous basis. Control criteria are used by the project team to ensure that progress is met. The goal of the building production control system throughout the project's implementation stage is to ensure that work is completed according to the timetable and that appropriate corrective steps are taken. A professional who has had academic training and is legally registered must be involved in every step of the production process to make sure the product meets its goals or objectives. Manufacture control is a organization that processes data and collects in order to get info about how long it takes to make a product and how much it costs, as well as how well it meets its quality standards.

Construction is extremely essential since it consumes more materials than any other business. We should not be surprised by the low cost of construction materials. nor must it disguise their significance. It should be inexpensive due to the enormous numbers necessary; otherwise, construction would be much more expensive and not as widely accessible as it is

now. According to economists, however, their use has a considerable environmental impact due to the sheer amount of consumption. It's the tools and gadgets of project management that make it hard for the subject to see what they know.

These methods can be used on a variety of projects. Because of the service aspect of the construction industry, information collected during the planning, scheduling, and controlling processes is rarely shared. Construction contractors have one of the highest failure rates. This high failure rate can be attributed to a lack of expertise.

II. RESOURCES FOR CONSTRUCTION

Any material that is utilized in the construction of a structure is referred to as a "building material." Many natural Materials were employed in the construction of this structure houses, including clay, sand, wood, and rocks, as well as twigs and leaves. Many man-made items are used in addition to naturally occurring materials, some of which are more synthetic than others. Building materials manufacture is a well-established sector in many countries, and their use is often divided into particular crafts such as carpentry, plumbing, roofing, masonry, and insulation work. Approximately 60% of the total cost of a construction project is spent on materials. Another part of the business, which isn't immune to the bad things that happen in the world, makes, imports, and distributes building supplies.

The majority of electrical items, roofing, windows, , sanitary wares, pipelines and Imported materials are used for finishing, with only a few notable construction material manufacturers in the country. Paint appears to be the only item that cannot be imported. While the same imported materials are available in multiple forms, In their own nations, the vast majority of them fail to pass even the most basic quality tests. but they nonetheless find their way different nations. In Nigeria, as an illustration, the Standard Organization of Nigeria (SON) inspects items based on a set of standards when there is no locally recognized quality. Instead of throwing up their hands and allowing any form of content into the market, they should take a stand, they must ensure that the organization is well-funded in order to carry out its statutory and critical responsibilities.

III. MATERIALS SELECTION FOR CONSTRUCTION

The phrase "materials" refers to all products acquired for usage on the project site, there are things that go into making things, like building materials and tools, as well as things like plant and equipment and administrative services, and storage facilities. Materials for building include electrical and mechanical fittings, fixtures, gadgets, and Instrument devices are used on-site to design permanent and temporary support structures. The building planning resources process includes locating items and calculating quantities, establishing specifications, anticipating requirements, locating potential suppliers for procurement plans, and tracking material current until all relevant construction activities are completed.

a) Material Requirements Planned (MRP)

According to Roy, material resource planning (MRP) is a scientific technique. Using those commodities in production, it includes purchasing supplies, and keeping track of inventory. It's a mix of inventory management and scheduling methods. The MRP is beneficial in production management once the ensuing criteria are:

- i. Because the product request is known, it is possible to determine the required manufacturing schedule.
- ii. Purchasing components, sub-assemblies, and raw materials requires planning ahead of time
- iii. The end-product has a suitably extended manufacturing cycle.
- iv. The input consists of a variety of components, subassemblies, and raw materials

b) Purchasing of Materials

Materials needed to complete projects must be purchased in a scientific manner. The following are the considerations to consider while making a purchase:

- a) Quality
- b) Quantity
- c) Price
- d) Source
- e) Time

a). Quality

A product's quality is determined by its specifications. The requirement covers the scheme, the materials utilised, the physical and chemical makeup of the materials, and their qualities, among other things. For example, the specification for building cement may include characteristics such as setting time, ultimate setting time, compressive strength, and so on.

Tensile strength, carbon content, and other characteristics can be used to describe steel used in construction. The materials and goods purchased for a project must meet certain quality standards. There will be no tolerance for quality that doesn't meet the stated standards because it will have an impact on the end results. In the same way, quality that goes above and beyond the established standards isn't acceptable because it will require more money but won't pay off in the same way.

b). Quantity

At each stage during the project's execution, the quantity of resources or items acquired must be optimal. Buying in small amounts by hand should be avoided because it will cause the project's implementation to be delayed. On the other hand, buying in excess of what is required is not recommended. Purchasing in excess of required amounts will raise inventory carrying costs since items purchased in advance will sit idle. For all of the important materials that will be used during the project, an economic order quantity can be calculated. Based on the lead time required for purchasing supplies from material suppliers, a reasonable reorder level for such materials may be determined. Once the re-order level is reached, the purchase quantity can be fixed at economic order quantity and an demand for material supply can be placed. Such smart planning will cut inventory maintenance costs and keep project costs under budget.

c). Price

The expected price is determined by the material or product's quality criteria of the material. As a result, the price is set by the materials or goods' expected quality criteria. If you want to get something for the lowest price possible without sacrificing quality, you can use a tender system to locate potential suppliers that can offer the best price for the quality you seek. When just a few vendors are available to supply certain materials or products, suppliers might be negotiated with to arrive at a more favorable price.

d). Source

Only from reliable sources can you get high-quality products at reasonable prices. Materials can be purchased directly from manufacturers, through dealers, or from open market vendors. All resource has its own set of advantages and disadvantages. Checking prices from different suppliers and the cost of transportation from one place to another can help you find the best place to get materials. Inventory refers to items that have not yet been used in the manufacturing of goods and services.

e). Time

The relevant materials must be made available at the time they are needed. It is a waste of money to buy and store supplies before they are needed, but if the project doesn't start on time because of a lack of materials, it will be much more difficult to finish it.

Material Preservation

Providing enough room, safety, and management for house supplies and components on the job site during the construction phase (Frank, 2005). can be defined as the provision of adequate space, protection, and control for building materials and components held on site during the construction process. It should be easy for construction technology workers to figure out the exact needs of certain products. However, the need for on-site storage and control can be looked at in more detail:

- A. Building materials and components can be classified as durable or non-durable, with the latter requiring some type of weather protection while in storage to avoid deterioration
- B. Group is the procedure of making sure that all important materials are brought to the site on time, and in good condition, in enough quantity, that unloading equipment is available, and that the right loading or stacking space has been set up.
- C. Size, shape, weight, and mode of delivery are all physical attributes that will help determine the safe management and stacking methods to use on site, allowing handling and storage costs to be determined.

ABC: Construction Materials Classification

There are no two projects that are alike when it comes to construction. Construction materials vary in variety and quality depending on the job. While some basic elements, such as cement, aggregate, steel, water, and wood, are ubiquitous, others vary depending on the job. Many of the finishing materials used in home projects, for example, are unnecessary in industrial projects.

The main goals of material classification are to keep quality, cost, and supply on track. When it comes to classifying materials, there are several criteria to consider. Some of them are storage space, supply reliability, shelf life, ease of identification, construction sequence, inventory expenses, and source, transportation needs, pricing, procurement time and project life. The following categories can be used to classify construction materials in general:

- I. Heavy, one-time purchases, frequent use, and small materials.
- II. Materials that is both required and desired.
- III. Materials that is native to the area and those that are imported.
- IV. High-priced materials, medium-priced materials, and low-priced materials
- V. Materials with a high, medium, or low utilisation value

Timetable for Materials

Material schedules for major materials and components should be developed in detail, according to Ogbadu. Reinforcement, such as cement, blocks, and wood, for example. Rather than using a bill of numbers, a materials schedule should be created from a drawing. The timetables will help with accurate order placement, delivery, and material storage on site. Material delivery must be carefully timed to ensure that the construction timetable is adhered to. By implementing this technique, it will be avoided if bottlenecks occur, unnecessary handling twice will be avoided, and damage will be prevented by this method. The format of the material schedule.

IV. RESEARCH METHOD

The study used a quantitative method, with questionnaires distributed to experienced experts in charge of building materials on construction sites in Abuja, Nigeria. The study area is near the researcher's home state (Abuja), and all of the construction projects are in the same general vicinity, the study's population included all experienced building trades professionals, engineers, architects, builders, and quantity surveyors are examples of professionals, who are mostly involved in managing and supervising building projects in all types of construction enterprises. A sample the 50 construction projects are worth a total of N100 million or above a 5 million Rand was chosen from this population using purposeful non-probability sampling procedures, with a whole of thirty receiving a response a 60 percent success rate, It is deemed sufficient for this study's topic. The decision was made due to the fact that, when compared to lower-value projects, Construction projects of this type of magnitude then below are more possible to have inadequate material management. The data was analyzed and discussed using the descriptive approach. The information gathered was presented in a table manner.

V. RESULTS AND DISCUSSION

Table 1: Demonstrates the instruments used to regulate the periodicity of building materials

Tool Percentage of Users	Percentage	Frequency	Percentage
Material Planning	26.7	Material Planning	20.0
Material scheduling	60	Material Scheduling	66.7
ABC Analysis	13.3	ABC Analysis	13.3

(Table 1) According to tool analysis, 60 percent of respondents use material scheduling for material control, with 66.7 percent using it frequently; 26.7 percent of respondents use planning material, with 20 percent using it frequently; and 13.3 percent of respondents use ABC analysis, with 13.3 percent using it frequently. It's important to note that scheduling is one of the most common tools. It tells you what your responsibilities or events are in the order they happen (set target), but it doesn't help you figure out how much it costs or how good the materials are, which are important when you buy building materials.

The following are the most typical reasons for using various controlling strategies, as shown in Table 2: 13.3 percent believe It was requested by a client, 26.7 percent believe it is for people to understand simply, 16.7 percent believe it is for top management comprehension, 13.3 percent believe it is best to control, 20.0 percent believe It helps with budgeting, and 6.7 percent believe it is e-commerce.

Table 2: Explains why a particular technique was chosen (s)

Causes	Percentage
Client's Request	13.3
For Top Management Understanding	16.7
Easily Understood	26.7
Good for Cost control	20
Best to Control	13.3
Most Commonly used Technique	3.3
Easy for Identifying Wastes	6.7

Table 3: Factors influencing material quality in building construction

Factor	Mean	Rating
Poor Planning	3.5	1
Equipment Breakdown	3.2	3
Late Delivery	3.4	2
Poor Storage	3.2	3
Shortage of Personnel	3	5
Inefficient Communication	3.1	4
Poor Material Testing	3	5
Improper Equipment	2.8	7
Incompetent of Personnel	2.9	6
Damage Material	2.6	8
Delay Payment to Supplier	2.3	10
Deficient Contractor	2.5	9
Subcontractor Bankruptcy	1.7	11
Unavailability of Proper Resource	2.3	10

According to the findings, the majority of respondents ranked poor planning as the most important factor, Late delivery, with a mean of 3.40, With a mean of 3.20, there is a breakdown of equipment, improper storage, 3.20 is the average and communication problems, with a mean of 3.1, came in second and third, respectively. With a mean of 2.30, the least relevant criteria were late payment to the provider, a lack of appropriate resources, and a lack of time. Also with a mean of 2.30, and subc. According to the analysis (Table 3), poor storage, poor planning, late delivery, and a lack of manpower are the key challenges influencing the quality of building production and materials management in the Nigerian construction industry. (Table 4).

According to the findings, most respondents place a high priority on controlling cash flow and project costs, with a mean of 2.5, Material allocation came in second with a mean of 2.4, manpower allocation, with a mean of 2.1, major equipment, with a mean of 1.7, and With a mean of 1.6, the project structure. The least main control area, Project structure has a mean score of 1.6, according to respondents.

Table 4: Controlling the prominence of regions

Controlling area	Mean	Rating
Materials Allocation	2.4	2
Cash Flow and Cost	2.5	1
Major Equipment	1.7	4
Project Structure	1.6	5
Man Power Allocation	2.1	3

VI. CONCLUSION

Poor material control planning, late material delivery having a significant the duration of the project, material theft or damage as a result of improper storage, finally, In Abuja, Nigeria, there may be problems with the quality control of building materials. This means that poor material testing could have an effect on the quality standard and specification of any construction materials in the city.

According to the findings, material scheduling is used as a basic tool/technique for regulating materials by the majority of construction organizations, with roughly 60% of users and a 66.7 percent frequency of use. Respondents believe it is simple to understand. The strategy would not have been a bad idea, but other ways to control materials could have been more effective.

VII. RECOMMENDATION

According to the conclusions of this research, the following are some suggestions in order to enhance effective material control in the Nigerian construction sector: According to the research, the vast majority of material planners have less

practical experience than anticipated. Thus, those involved in material management should have sufficient knowledge and expertise, particularly in the practice of material control.

Building material control should be implemented on all sites and by all types of construction companies, large, medium, and small. In order to construct a work study, the scope of work, the type of work to be done, as well as the materials to be utilised, should all be determined, and every building business should have a plan for managing reducing materials each conceivable reason that could lead to failure of a project. Controlling materials can help reduce costs, waste, time, and quality. As a result, people who work in the construction industry should be trained in materials control, and an educational institution should be set up to teach people about the importance of managing building materials.

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