Effect of the decisive elements in the material management technology

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Abstract: It is apparent that effective and efficient material management will reduce the problem of unnecessary material wastage, scarcity of material, cost-overrun and time-overrun. The research centred on the factors affecting the material management strategies of construction works. This study examined the existing strategies of materials supervision on building projects, the challenges of materials management and material management steps for construction projects in the state of Ekiti. This research was carried out by conducting questionnaires and evaluated by means of a Relative Significance Index (RSI) for professionals in advising and contracting firms. The analysis showed that material distribution sequence was graded as one at the rate of RSI 1,003, followed by local supply and weak preparation and coordination with the values of RSI of 0.79 (79%) and 0.74 (74%) respectively. Damage of material in storage was ranked least with the RSI value of 0.597 (59.7%). The study recommends that there must be sequence of materials delivery to avoid waste and theft, the construction materials must be readily available within the surroundings, stringent laws to eliminate quack/sharp practices and promote professionalism in design and construction works should be enacted and religiously enforced, there must be adequate planning and coordination and there must be good and effective communication among site workers.

Keywords: building, construction, management, material, strategies.

I. INTRODUCTION

Material management is important because many issues come up on construction site like non-availability of material, inadequate storage, lack of proper handling, and late delivery of materials, etc, which results in cost overrun and time teeming, and perhaps abandonment of building plan. The problem of excessive waste, material shortage, overhead and time overrun is clearly reduced through efficient and effective management of materials.

If material management is a planning process as defined earlier, invariably the need for awareness in eradicating unacceptable practices in order to move the Nigerian construction industry forward is a vital necessity. Material management is an approach to the planning, coordination and monitoring of activities related to material flow into the coordination. The scope of material management varies widely between businesses. Material planning and control, production planning, buying, inventory control, the transfer of in-house waste materials and waste management can include this. It is an operational feature for the optimum planning, procurement, transfer and storage of material that helps organisations to reduce the various costs such as inventory, purchasing, material management and distribution. Building materials represent about 60% of total project cost and 80% of the project schedule are regulated. Based on 5.5% benefit from project costs, a 2% decrease in material costs would make 21% more profitable [3]. Stock supply, increased labour efficiency and decreased stock surpluses are benefits of a material management system. [1] Recall that incorporating the ICTs in material management and practises would substantially reduce unnecessary costs and improve efficiency in any project. There is a need for ICTs focused on material management practises in the construction industry, and there is significant interrelationship between relevant players in building, and their management can directly impact time, costs, quality and morality on project performance.

II. LITERATURE REVIEW

The management of materials provides a planning, organization and monitoring approach for all of those activities which mainly involve material flow into an organisation. It is a business feature for optimum preparation, procurement, transfer, storage of material that allows the company to minimise various costs such as inventory, procurement, handling of materials and distribution. The design and monitoring of functions supporting the entire content cycle (flow) and the related knowledge flow. These functions include: classify, catalogue, standardise, classify, schedule, purchase, inspect, monitor quality, box, storage, inventory control, delivery and disposal. Often named preparation products The importance of good management of the material is emphasised by the fact that the materials account for significant portions of project cost and time listed in [4], the management of the materials is characterised as a
system of management that is essential to schedule and track the quality and quantities, the placing of timely materials, the good prices and the appropriate quantity.

The management of materials is characterised as a role to coordinate the planning and control of the flow of materials. In a comprehensive perspective, the management of materials is a scheduled process involving the procurement, supply, handling and minimal waste, to ensure that the specifications specified by [6] are met and that material waste is an additional expense, in addition to the used equipment, plus handling as provided for in the estimated job price. [4] was of the view that, when and in compliance with the minimum cost construction process, management of materials could be defined as the planning process, execution and control of the correct source of materials of exact quality. Material management may also be called quality management, since it minimises the cost impact of material on the execution of projects. [4] Considered that a material cost management goal is the early identification of any potential cost deviation in the budget (cost overrun) for the purpose of taking corrective steps in compliance with forecasts. Similarly [6] expressed the view that the aim of material cost inspection is to require scheduled and scheduled materials.

**FACTORS THAT AFFECT THE MATERIAL MANAGEMENT STRATEGIES OF CONSTRUCTION WORKS**

The management of materials is a mechanism for the preparation, execution and control of building and office operations. The purpose of material management is to ensure that building materials are available when necessary at their point of use[5]. It was observed that there are many factors that were identified among other factors that affect the material management strategies of construction works include sequence of materials delivery, availability of material in the local market, material changes in type and specification during construction, damage of material in storage, delay in the special manufacture of building materials, unreliable supply from material suppliers, poor planning and co-ordination, poor communication between sites, inadequate waste management plan, transportation for large quantities, inadequate knowledge of IT solution on materials management, improper handling on site/manual materials handling, workers’ mistakes/misuse of specification, excessive paper work, management of surplus materials, dispute resolution strategies and lack of skilled negotiating procedures. Project materials management practises are classified as practises in five areas [6]: planning, sourcing, transport, handling and waste management.

**III. RESEARCH METHODOLOGY**

A well organised sixty (60) questionnaires were administered on contractors in selected construction firms in Ekiti State in order to appraise the factors that affect the material management strategies of construction works.

The collected data was tabled and the analytics were performed using basic statistical tools to include percentages among other methods. In the third institutions in Nigeria, data obtained from different professionals within the built environment were analysed by using the arithmetic mean and the ranking of the statistical study by decreasing value method. For evaluation purposes the average scoring was used to investigate the causes, consequences and potential corrective activities and the observations from which conclusions were drawn. The results were identified. The following formulation was used to measure the arithmetic mean:

\[
\text{Mean score} = \frac{\sum W_i f_i}{Nj}
\]

Where \( \sum W_i f_i = \) the summation of the weights.
\( \sum f_i = \) the summation of responses

The factors were measured by using the Likert level linking rating on gap scale of 5 and 1 which was developed for submission in public sciences and organization researches for quantification of qualitative variable be used, namely:

- 5 represent “Extremely important (EI),”
- 4 represent “Very important (VI),”
- 3 represent “Somewhat important (SI),”
- 2 represent “Not very important (NVI),”
- 1 represents “Not important (NI).”

**IV. DATA PRESENTATION AND ANALYSIS**

This study was focused on three major influencing factors affecting the material management techniques that are then described and described within the factors identified.

<table>
<thead>
<tr>
<th>Table 1: Respondents’ Gender</th>
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<tr>
<td>Gender</td>
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<tr>
<td>Male</td>
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<td>Female</td>
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<td>Total</td>
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Table 1 shows respondents’ gender. It showed that 68.33 (41) percent of the respondents are males and 31.67 percent (19) are females.

**Table 2: Professional body you belong to in the Construction Industry**

<table>
<thead>
<tr>
<th>Professional body</th>
<th>Frequency</th>
<th>Percent</th>
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<tr>
<td>NIQS</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>NIOB</td>
<td>27</td>
<td>45</td>
</tr>
</tbody>
</table>
A. CONCLUSION

The study highlights the importance of adequate knowledge of IT solutions in materials management, as it shows a RSI value of 0.667 (66.70%), higher than the RSI values of 0.637 (63.70%) and 0.643 (64.30%) for issues related to unreliable supply from material suppliers and poor communication between sites, respectively. The study also reveals that the management of surplus materials ranked eighth with a RSI value of 0.723 (72.30%), followed by dispute resolution strategies with a RSI value of 0.667 (66.70%).

VI. DISCUSSION OF FINDINGS

Workers’ mistakes/misuse of specification ranked first with a RSI value of 0.793 (79.30%), while the management of surplus materials ranked eighth with a RSI value of 0.723 (72.30%). The study also identifies the following key findings:

1. The availability of materials in the local market is crucial, with a RSI value of 0.76 (76%).
2. Delay in the special manufacture of building materials ranked second with a RSI value of 0.74 (74%).
3. Unreliable supply from material suppliers ranked third with a RSI value of 0.73 (73%).
4. Poor planning and co-ordination ranked fourth with a RSI value of 0.72 (72%).
5. Material changes in type and specification during construction ranked fifth with a RSI value of 0.69 (69%).
6. Damage of materials in storage ranked sixth with a RSI value of 0.68 (68%).
7. Inadequate waste management plan ranked seventh with a RSI value of 0.67 (67%).
8. Dispute resolution strategies ranked eighth with a RSI value of 0.66 (66%).
9. Transportation for large quantities ranked ninth with a RSI value of 0.65 (65%).
10. Others ranked tenth with a RSI value of 0.64 (64%).
11. Inadequate knowledge of IT solution on materials ranked eleventh with a RSI value of 0.63 (63%).
12. Poor communication between sites ranked twelfth with a RSI value of 0.62 (62%).
13. Excessive paper work ranked thirteenth with a RSI value of 0.60 (60%).
14. Inadequate knowledge of IT solution on materials ranked fourteenth with a RSI value of 0.59 (59%).
15. Management of surplus materials ranked fifteenth with a RSI value of 0.58 (58%).
16. Lack of skilled negotiating procedures ranked sixteenth with a RSI value of 0.57 (57%).
17. Others ranked seventeenth with a RSI value of 0.56 (56%).

The study concludes that there is a need for improved communication and coordination between sites, as well as better management of surplus materials. The results suggest that interventions aimed at addressing these issues could significantly improve material management in construction projects.
to eliminate quack/sharp practices and promote professionalism in design and construction works should be enacted and religiously enforced, there must be adequate planning and co-ordination and there must be good and effective communication among site workers.

The findings revealed that sequence of materials delivery, availability of material in the local market, material changes in type and specification during construction, damage of material in storage, delay in the especial manufacture of building materials, unreliable supply from material suppliers, poor planning and co-ordination, poor communication between sites, inadequate waste management plan, transportation for large quantities, inadequate knowledge of IT solution on materials management, improper handling on site/manual materials handling, workers’ mistakes/misuse of specification, excessive paper work, management of surplus materials, dispute resolution strategies and lack of skilled negotiating procedures are the factors that affect the material management strategies of construction works.

B. RECOMMENDATIONS

Based on the findings of this research and a review of previous research, the following recommendations were made:

i. There must be sequence of materials delivery to avoid waste and theft.

ii. The construction materials must be readily available within the surroundings.

iii. Stringent laws to eliminate quack/sharp practices and promote professionalism in design and construction works should be enacted and religiously enforced.

iv. There must be adequate planning and co-ordination.

v. For the successful construction work there must be good and effective communication among site workers.

REFERENCES


