

Improving Effective Material Management by Identifying common Factors in Building Construction Project

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Abstract - Management in materials has great problems for many years to most firms in construction project. This paper work is based on improving current material management through identifying common factors for building construction. Having the accurate materials and time is an essential aspect for the accomplishment of construction project. This study has revealed that construction materials may constitute more than 55% of overall cost for a distinctive construction project. One of the main difficulties in delaying construction projects is improper materials and equipment management. In this study factors affecting effective material management and Inventory management were listed in accordance with the most affecting factors based on literature review. In this paper Relative important (RII) methods were used for data analysis. Therefore the proper management of this single largest element can improve the output and price efficiency of a project and help ensure its timely completion.

Key Words: Construction Material, Inventory control, Management, Project management, Relative important index (RII) method

1. INTRODUCTION

Material management is a task that pointedly contributes to the achievement of a project. As projects develop in scale and difficulty, material management is required really to use them. It remains the process that organizes planning, purchasing, transporting, receiving and inspection, storing, handling and monitoring of materials, reducing the wear and tear and optimizing the productivity by minimizing cost of materials. The objective of material controlling is to safeguard that materials remain existing at their point of usage when needed and accurate quantity and quality of materials are appropriate selected, purchased, delivered and handled. Indeed material management will cause a huge effect. On the whole project cost, time and quality. Material management should be measured in construction projects as an energetic management to achieve superior productivity and profit, which should be interpreted into cost discount and successful completion with best quality. It is surely that material management performs increase capability in operations and reduces overall costs. According to Professor Raju Narwade (2016) Cost remains an essential constraint of every project. On the other hand when material availability at site is delayed it will affect scheduling of activities. Material must stay available trendy hand at right time for effective completion of project.

1.1 Factors Associated With Material Management

There are many factors described in the area of material management and each of these influences can make to latent problems. Zakeri et al (1996) recommended that factors such as: transport difficulties, waste, inappropriate handling on site, lack of suitable work plan, misuse of the specifications, inappropriate material transportation and extreme paperwork totally adversely effect on material management. Common factors mostly disturb material management are enumerated as follow.

1.2 Problems arising lack of special care in material management.

- ❖ Receiving incorrect material type
- ❖ Increase materials quantity in storage
- ❖ Burglary, theft and vandalism
- ❖ Destroy material in shipping
- ❖ High cost in material transportation
- ❖ Unavailable required quantity
- ❖ Too early receiving of materials earlier usage
- ❖ Incorrect material take-off from drawing and design
- ❖ Material Shortage during construction
- ❖ Piling of inventory materials
- ❖ Poor material selection
- ❖ Project delay because of slow delivery materials
- ❖ Suddenly alternation price of materials
- ❖ Ineffective control of storage

1.3. Factors increase waste in construction projects

- Incomplete drawing design and specification
- Poor cutting of materials (glass, tiles, plywood)
- Inefficient utilization of temporary materials (hoarding, formwork, scaffold)
- Poor security on site (theft and vandalism)
- Lack of care in transportation
- Inadequate skill in utilization of materials
- Insufficient places for material storing
- Wrong methods and regulations in materials usage
- Poor materials storage facility

- Lack of supervision and proper control during storage
- Wrong material utilization

OBJECTIVES OF MATERIAL MANAGEMENT

- ❖ Efficient and effective materials planning
- ❖ Buying or Purchasing
- ❖ Obtaining or Procuring
- ❖ Receiving
- ❖ Inventory control
- ❖ Supply and delivery of materials

Components of material management:

- Material planning, forecasting and budgeting
- Scheduling, purchasing and procurement
- Receiving & inspection.
- Inventory control and storage
- Material management then delivery



Fig.1: Process of Material Management

Functions of material management

To accomplish the objectives of material management as stated above to encounter the basic objectives and areas, the functions performed in material management are classified as primary and secondary functions.

I. Primary Functions

To meet the objectives of the study in construction materials, the primary functions are noted as follows.

- Materials Supplies Planning
- Acquiring or Purchasing
- Storage Planning and Control
- Find out and Maintaining the Movement and Source of Materials

II. Secondary Functions

- Regulation and Simplification
- purchase and Acquisition Decisions
- Coding and Grouping of Materials
- Estimating and Planning

PROJECT MANAGEMENT

Different training meetings should be settled on site to notify the workers concerning the newest techniques. Manufacturing machinery has to be well-run regularly to avoid any break down. Labors and contractors ought to be guided for correct training to accomplish a specific task. According to Berliner B. "project controlling is mostly based on effective budgetary management and performance measures.

PLANNING

The most frequently used basis for planning things out for the project is the BOQ prepared by the client. Most companies have two main levels in planning- micro and macro level. The planning would be reviewed regularly as possible whether the work is continued as per planned or not

INVENTORY CONTROL

Sundersan M. defines inventory as the sum of the worth of raw materials, petroleum and lubricants, replacement parts, maintenance usable at any specific point of time. Kasim.et.al (2012) analyzed an improving on site material tracking for store management in construction. It is essential to manage all materials and records throughout construction activities. Failure in site inventory management will consequence in cost overrun, and interruptions in project closing time

2. Problems identified in material management

Table -1: Phase 1- Materials Identification

Problem	Description
Undefined scope	No right explanation of whatever is wanted
Lack of communication	Lack of communication between parties involved
Incomplete drawings	Plans are not finished and details are missing
Lack of certification to requirements	What is required by the purchaser is not what is prepared
Nonstandard specifications	Use of descriptions that are not commonly used
Incomplete / ineffective meetings	Issues not determined during meetings

Phase 2- Vendor Selection criteria

Problem	Description
Uncontrollable bid list	Have too numerous suppliers and too little evidence
Incomplete proposals	Suppliers do not contain all documents required

Phase 3: identification of Procurement Problem

Problem	Description
Matching price to competitor's price	Price discount to match competitor's price
Late deliveries/delay of material on construction site	Resources are not transported as per schedule
Poor communication	Lack of communication between parties
Unrealistic delivery dates	Delivery dates difficult to meet

Phase 4: Construction Phase

Problems	Description
Delivery wrong materials	There are variances in material ordered and delivered
Incorrect sizes delivered	
Incorrect quantities delivered	
Keeping track of material	Don't know where materials are at specific time
Rehandling of material	
Storage of material	
Loss of material	
Damage	
No supplier QA	No quality declaration from supplier
Poor communication	
Receiving, handling and storage of unused materials	

LITERATURE REVIEW

There are various factors which facilitate poor material controlling in construction engineering. Zakeri et al. (1996) find out those factors which cause transportation problems, wastage, inappropriate handling on site, wrong use of the specifications, and absence of appropriate work plan, unsuitable material transport and too much paperwork all badly effect on material management. [2]

Improper materials management can consequence in increased costs throughout construction project. Efficient and effective management of materials can result in considerable savings in project costs. Materials may deteriorate in store or get stolen if special attention is not taken. Delays and additional costs may be sustained if materials required for particular works are not available. (Hemishkumar Patel, Dr. Jayeshkumar Pitroda). [3]

According to Pande and Sabihuddin (2017) Material management method is a critical element of the construction business. A properly executed materials management plan can accomplish the timely movement of materials to the jobsite, and consequently to simplify improved work appearance planning, improved labour productivity, better schedule. [4]

According to Dr. Kevin .A explained that factors disturbing material management for the selected case study of building sites and practice of right material in the right place at the right time is necessary for effective implementation of a building project. The research concluded that Material management indications to effective cost control, to increase

the quality and time execution of their projects and reduces failure of a project. [5]

Productive and well-organized material management trainings are important in construction industry. The study indicates that construction materials constitute about 70% of the entire cost for a typical construction project. Proper management ethics and practices are required for this component which will improve the efficiency and cost effectiveness of the project and thus helping on time completion of the project. (Khyomesh V. et. 2011) [6]

Poor documentation of material, in appropriate and insufficient storage cause damages in labor output and overall delays that can incidentally increase total task cost. (Ashwini R. Patil, et.al 2013) [7]

Materials management methods require a renovation to improve the totally in management of materials for more efficiency and effectiveness on the construction site. This is since poor handling of construction materials disturbs the overall performance of construction projects. (A.A. Gulghane 2015) [8]

According to Ms. Priyadarshani .et.al (2017) most of constricting companies are reflected the main problems in using computer in material management are lack of user-friendly computer program and no understanding for importance of computer program. [9]

According to Harsh Soni, Dr. Jayeshkumar Pitroda, and Prof.J.J.Bhavshar (2016) selective inventory control method to maintain adequate stock of raw material during the time of short supply, to protect inventory against decline and control asset in records and to keep it at an optimum level by using an inventory control techniques. [10]

According to Abhilin G B, (2017) applying enough stock of raw materials in period of short supply, to protect inventory against deterioration and control investment in inventories and to keep it in an optimum level by using an inventory control techniques. [11]

RESEARCH METHODOLOGY

The research methods which used for data analysis regarding factors disturbing material management were called Relative Important Index (RII). Relative Importance Index were used to determine the relative importance of many factors affecting construction material management in construction firms and used for ranking delays in many construction industries. The five-point scale (Likert scale) ranged from one (very little degree affect) to five (very high degree affect) is adopted and transformed to relative importance indices for each factor as follows:

$$RII = \frac{\sum W}{A \times N}$$

Where, W = is the weighting given to each factor by the respondents (ranging from 1 to 5),

A =is the highest weight (i.e. 5 in this case), and
N= is the total number of respondents.

3. CONCLUSIONS

This research has studied the current material management in local building construction projects. This paper defines material management as measures for effective material management, factors commonly affecting material management in building construction projects and problems related with material management. Generally, we will recommend that to improve effective material management in building construction sites.

- There should be an integrated material management group co-ordination among the site and the organization.
- Proper control, monitoring and tracking of the system is required.
- Attentiveness and liability should be generated inside the organization
- There is a necessity of an efficient MIS integrating all aspects of material management.
- Firms employing suitable material management mandate to increase their overall efficiency

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