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Considerations Influencing Construction Site Material Management

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Abstract - Examining what makes for good materials management in building projects is the focus of this study. For a construction project to run well, it is crucial to have all of the necessary supplies on hand at all times. The gaps left by sloppy material management on building sites are being filled up by this research. If not handled correctly, materials—which account for more than 70% of the total project cost—could impact the whole project budget. The research details the experiences of nine different Maharashtra-based small, big, and medium-sized businesses. Factors impacting material management were identified via analysis of collected data. In order to address some of these issues, it was suggested that companies should include materials management in their overall policies.

Key Words: Construction Materials, Management, Construction site, Project cost, Material Management.

Management.

1. INTRODUCTION

The timely and cost-effective completion of a construction project is dependent on the availability of competent personnel armed with the appropriate tools. Not only is it critical to have the necessary supplies on hand, but it is also critical to have the necessary funds available to pay for them [1]. Materials management is the system for planning and controlling to ensure that the right quality and quantity of materials and equipment are specified in a timely manner (Donyari and Flanagan, 2009). The term "material management" refers to an organizational framework that unifies the processes of sourcing, buying, and tracking materials. Based on those definitions, generally materials management can be defined as a process of planning, executing, and controlling the right source of materials with the exact quality, at the right time and place suitable for minimum cost construction process. The materials management team is also responsible for hiring, training, and placing employees in the areas of marketing, buying, inventory control, retail management, and materials handling. Because of this, a materials management department is crucial in any company to aid management with manufacturing tasks. As an added bonus, it facilitates marketing, sales promotion, and the management of all materials in terms of quantity, quality, and cost. Therefore, this paper's goal is to identify the elements impacting building site material management and to provide solutions to these issues. This study describes the general procedure followed by small, medium & large construction firms in Maharashtra, India and factors affecting the material management for all three sizes of construction firms. Some corrective actions were proposed to get past these obstacles.

1.1 Objectives of the study

- To gather the information about material management procedures of different firms. To study the different material management procedures (From collected data).
- To find out factors affecting material management for small, medium & large construction firms.
- To suggest remedial measures to overcome factors affecting material management on construction site.

1.2 Benefits of study

Following are the benefits of study:

- Improvements in labor productivity
- Improvements in project schedule
- Quality control
- Better field material control
- Better relations with suppliers
- Better handling of material
- Reduction in duplicated orders
- Material is on site when needed and in the quantities required
- Reducing the overall costs of material
- Reduction in technical problems
- Avoids seasonal problems arising with materials
- Reduces overall project cost
- Avoids delay in work, etc.

2. THEOROTICAL FRAMEWORK

Dr. Kevin Okorochoa claims that building projects would reap the rewards of an effective materials management system. Today, no company can afford to fail if their cash flow isn't in good enough shape. If materials are purchased early, capital may be tied up and interest charges incurred on the excess inventory of material. Theft or material deterioration while storage is only one of the many risks; in the absence of certain supplies, certain tasks may be postponed or cost more than anticipated [1]. N.B. Kasim states that it is clearly important to manage all materials from the design stage to the construction stage. Time, money, quality, and productivity are all negatively impacted by the careless management of building materials. It is important for construction businesses to limit material waste throughout the project so that they may avoid losing money. Improving the manufacturing process's efficiency in fast-track building projects requires novel methods of materials management [2]. One of the most expensive parts of building something is the materials needed to build it, as Ashwini Patil explains. Since materials may account for as much as half of a project's overall budget, contractors would be well to take into account the possibility that the timely availability of materials will determine the project's ultimate success or failure [3]. T. Phani Madhavi claims that material, equipment, labor, subcontractor, overhead, and general condition factors all contribute to project cost variances in the management of construction projects. When building anything, material is king. Therefore, if the material management is not properly managed it will create a project cost variance. Taking corrective steps towards the cost variation is one way to manage project costs. To keep the process under control, it is typically required to allocate significant resources (time, money, people) [4]. A.A. Gulghane describes that Materials management processes require a transformation to improve the overall in handling of materials for more efficiency and effectiveness on the construction site. This is because poor handling of construction materials affects the overall performance of construction projects in terms of cost, time, quality, and productivity [5].

3. MATERIAL MANAGEMENT

The goal of material management is to keep project costs down by ensuring that the appropriate materials are available when needed in sufficient quantities. Planning, identifying, acquiring, storing, receiving, and distributing materials are all aspects of material management. At its core, material management is responsible for overseeing the movement of materials from the point of order, receipt, storage, and eventual usage. Ultimately, the purpose of An essential component of effective material management is the timely and accurate acquisition of all necessary supplies; hence, the timely and accurate procurement of materials is crucial to the accomplishment of any given task. An integrated material handling process

that begins with design and continues through material consumption is necessary for successful materials management on site for fast-track projects. Purchasing, using, and storing materials are the three pillars upon which effective materials management rests. Its use lowers expenses, which boosts profits and simplifies manufacturing. Not only does it aid with material pricing and supply management, but it also aids with transportation, storage, handling, distribution, and optimal usage.

3.1 Basic Components of Material Management

There are four basic components of material management:

- Value analysis
- Purchasing
- Material Handling
- Store Keeping
- Recycling/Disposal

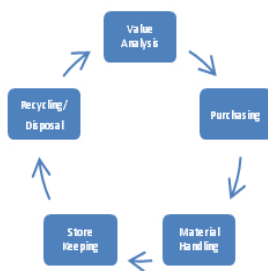


Figure 1: Components of Material Management

3.2 Objectives & Importance of Material Management

- Efficient use of the working capital
- Lowering inventory investment
- Increase in inventory turnover
- Responding to the market changes related to any product
- Ensuring the cooperation of all departments
- Providing best services to the king of market i.e. customers.

3.3 Advantages of Material Management

- Systematic operations
- Reduction in cost of material handling
- Reduction in overall cost of the project
- Increase in productivity of the labors
- Time management
- Quality control
- Better relations with suppliers
- Better relations with customers
- Reduces seasonal problems arising with materials

4. DATA COLLECTION & ANALYSIS

The methodology adopted for data collection in this study was questionnaire survey. For this study total of nine firms (3 small, 3 medium, 3 large) were selected randomly in the Maharashtra region of India.

The questionnaire used for the data collection is given in the annexure at the end.

The data gathered from the questionnaire survey was arranged and studied properly. According to gathered data it was found that there were few flaws in the material management systems of all three sizes of construction firms which affect the material management.

4.1 General Procedure for Material Management of Large firms:



Figure 2: General Procedure for Material Management of Large firms

4.2 General Procedure for Material Management of Medium firms:



Figure 3: General Procedure for Material Management of Medium firms General Procedure for Material Management of Small firms:

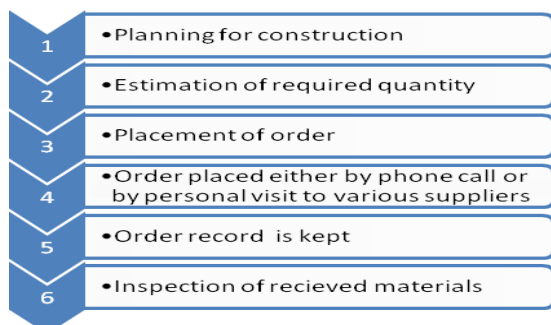


Figure 2: General Procedure for Material Management of Small firms

4.3 Factors affecting material management for: Large firms:

- Delay due to rejection of materials from quality control team
- Transportation problems
- Seasonal problems

Medium firms:

- Delay due to rejection of materials from quality control team
- Transportation problems
- Seasonal problems
- Labor strikes
- Improper handling of materials

Small firms:

- Delay due to rejection of materials from quality control team
- Transportation problems
- Seasonal problems
- Labor strikes
- Communication problems
- Hike in material prices
- Lack of material management
- Improper material handling

5. OBSERVATIONS & DISCUSSION

Studying above cases it was observed that only large firms use typical protocol & software for material management, hence they faced minimum problems.

On the other hand medium & small firms lack behind in material management as they don't use any software or they aren't aware of material management techniques.

It was observed that there is no any material management department in small & medium construction firms.

It was seen that though the large construction firms are using material management techniques, software, etc. still they are facing problems in the material management process.

Lack of material management ultimately results in delay in work, project cost overruns, decrease in labor productivity and wastage of materials.

6. CONCLUSION & RECOMMENDATIONS

Research into the aforementioned instances led to the conclusion that big companies are competent in implementing material management strategies on building sites.

Because they don't utilize software, medium-sized businesses have both seasonal and technological issues.

Due to a lack of understanding, small businesses lag behind medium and big organizations when it comes to material management.

The following recommendations were given considering all sizes of construction firms:

- Top management should pay more attention towards material management.
- Use of software like MSP, PRIMAVERA, ERP, SAP, etc. should be done to avoid manual errors in material management.
- To avoid delay due to rejection of materials by quality control department or seasonal problems, the construction

firms should store extra materials like steel, cement, etc. for emergency purpose.

- To avoid communication problems, it is recommended that all the indents, requests, notes; records should be kept in the written format.
- To reduce the wastage due to improper material handling, material handling equipments like conveyor belts, trolleys, cranes, etc. should be used.
- ABC analysis should be done for value analysis of the inventory.
- Before placing any order every construction firm should apply EOQ technique to reduce project cost overrun.

It is recommended to follow the procedure given below to implement the material management effectively:

1	Planning and procurement
2	Analysis of the inventory
3	Preparation of a tender in preparation
4	Study of auto tenders
5	General purchase from corporate office
6	Analysis of the tender process
7	Sending enquiry to various suppliers in written format
8	Study of received quotations
9	Preparation of comparative statement in written format
10	Comparison of rates with the selected supplier
11	Approval of rates in written format
12	Preparation of purchase order in written format
13	Sending purchase order to selected supplier in written format
14	Tracking of delivery of material record should be kept in written format
15	Inspection of received material, inspection report should be kept in written format
16	Material of rejected (irregular) quality should be kept in stock on a track kept for emergency
17	Material stores department supply as demand
18	Proper disposal of waste or surplus material

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