

A Review on Materials Management System in Construction Industry

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Abstract - Materials management is a vital system that plays a significant role in working of an organization. In construction related industries approximately about 60% or above cost is associated with the materials with respect to overall cost. In construction industry, materials have significant role in overall quality of final construction. For this a proper materials management system is very necessary. In this paper, from literature study, various aspects of materials management are discussed. From various research papers, current scenario in materials management in construction industries is studied and elaborated. Necessity of a proper materials management system in construction related industries is studied.

Key Words: Materials management, Necessity, Construction industries, System, Tools, Techniques

1. INTRODUCTION

In the basic infrastructure of any industry or organization; it may be related to service industry, manufacturing industry, production industry or industry in any sort of field or subject, there are five main resources that are considered viz. Material, Man, Money, Machine and Time. In these five points, Materials and so the Materials Management is one of the most vital key points that are considered for overall goal achievement, success and satisfaction of that particular industry. Similarly in Construction Industry also the concept of Materials Management is considered to be a vital key point from the aspects of overall economy, quality of the end product, time span for the particular project and overall satisfaction of the firm as well as that of the costumers & the owner of developed product or infrastructure. As per survey and research, materials cost approximately about 60% or above of the overall economy of construction project.

1.1 Definition of Materials Management

As per International Federation of Purchasing & Materials Management, "The materials management is the total concept involving an organizational structure unifying into single responsibility, systematic flow and control of material from identification of need through customer delivery."

Materials management is responsible for developing a co-ordination between activities like planning, sourcing, procurement, movement, storage, use and control of materials in best way possible so as to provide predefined service to customer in an economic way to the organization.

2. LITERATURE REVIEW

Caldas Carlos H., et al.[1] have described the results of their study which was aimed to identify materials management system that reflects current and emerging in capital projects industries. This research was done by surveys, interviews and case studies that involved 54 different organizations. Set of different practices, concepts and issues related to materials management was formed collectively and the responses given by organizations are given in form of percentage. With the help of the extensive data collected with this research, different aspects and stages of materials management system are addressed in detail. The research paper conclude by highlighting importance of proper materials management system and also one of the main points explained here is use and up gradation of modern IT systems for materials management in construction related industries.

Georgekutty C. K., Dr.Georgemathew [2] have given the conclusion and report of the extensive literature review and data collected from various site visits and questionnaire surveys. The researches have tried to address various problems in construction industries that generally cause time and cost overruns in this aspect; they have focused on materials management in construction industry. The data collected was statistically analyzed by various tools and techniques like Statistical Package for Social Sciences (SPSS), Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA) and various constants are used. After these, aspects where materials management in construction industry lacks is identified and addressed.

Greeshma C., K. Harish [3] aimed to find out the various materials management tasks and their priority, problems that are faced in materials management process and their occurrence. The data was collected by the authors by survey and questionnaire. The index and priority number is given for individual point considered under materials management. After analyzing data, researchers have attempted to develop materials management software that will be helpful for materials management on the site and will give ease in for materials management processes on site.

Karoriya Deepak, Dr. Pandey Mukesh [4] mainly focused on Economic Order Quantity (EOQ) technique used for materials management in construction industry. The researchers have tried to present the literature review and data collected from various surveys related to the materials management. Various problems that are faced in materials management in construction industry on site are also addressed. According to the researchers, EOQ technique can prove to be helpful to minimize the cost overrun problems due to improper materials management in construction industry. The part of the paper addresses in brief about materials wastage management on the construction site. The researchers have tried to explain how EOQ helps to order the perfect required amount of materials at the particular time at right place.

Pande Aditya A., S. Sabihuddin [5] have addressed the basics of materials management. Literature survey, questionnaire and actual site studies are carried out. ABC and EOQ analysis is done. Both quantitative and qualitative studies were carried out. MSP software is used for comparing actual and planned cost. Also S curve analysis is done and reasoning is given for the same. Inventory control techniques were applied.

Patel K. V., Vyas C. M. [6] for the research purpose in Ahmedabad region, construction firms are selected after a quick survey. The researchers have selected 3 well-known builders in the region. The researchers have described the main results of the survey carried out in Ahmedabad that investigated the material management of 3 well-known builders of Ahmedabad. The components, objectives, functions of materials management systems are addressed and described. At every phase or stage of materials management system, what are the problems occurring are identified. The overall materials management systems of three companies are given and explained with their individual plus points. The paper concludes with remarks like; Proper control, tracking and monitoring of the system is required, there is a need of an efficient MIS integrating all aspects of material management and proper materials management system will prove to be a key point in the overall enhancement in the performance and efficiency of the construction and also of the construction firm.

Patil Ashwini R., Pataskar Smita V. [7] mainly focused on variation in planned Vs actual material cost through S curve analysis and applying inventory control technique so as to maintain sufficient stock of raw material in period of short supply, to protect inventory against deterioration and control investment in inventories, to keep it in an optimum level and to minimize stock out problems, to minimize the total cost of inventory. In this research, inventory control techniques which were used are ABC analysis and Economic Order Quantity (EOQ) technique. It also gives the qualitative information regarding deviation in planned and actual materials in terms of S curve analysis using MSP tool and reasoning over the deviation is essential to know the effect of material planning before execution of project. Various comments on S curve analysis have been given in terms of problems of administrative causes,

consultant's causes, contractor's faults, and unavailability of resources. These major reasons of changes between actual cost of materials and planned cost of materials are addressed in this paper in detail.

Roger Antony A., Navodaya V. [8] have explained an automatic technique approach to overcome some of the errors that take place during materials management process. In this approach a combination of Near Field Communication (NFC) & Global Positioning System (GPS) technologies is used for materials management which has potential to facilitate low cost, ease to implement solutions to identify materials and components and to track those. This system is fully automatic. This system provides effective identification and tracking in all phases like production, transportation, on construction site. In this paper the system is explained with basic principle, working and use.

3. BASICS OF MATERIALS MANAGEMENT

The overall focus of materials management is on achieving the increased productivity and reduction in large amount of capital locked up for long periods in the form of inventories. More caution is made on achieving economy of the project regarding materials without hampering the flow of materials at and whenever required.

Once the material procurement is made and material is brought by the organization, its value continuously increases. Along with the actual cost of materials, the cost associated with storage, maintenance, movement, use gets added to the cost of materials. Since material is a very vital resource for construction in all aspects related, materials management system should be proper.

3.1 Activities in Materials Management System

Basically a materials management system can be broadly considered to have following main activities to perform to ensure proper effect. The basic activities associated with materials management system are:

1. Estimation and Planning
2. Ordering and Procurement
3. Receiving
4. Inspection
5. Storage
6. Movement and Use

3.2 Goals of Materials Management System

With the basic activities as stated above, materials management system works to fulfill the following basic goals:

- An uninterrupted flow of materials
- Best quality material
- Right quantity of materials at right time and at right place
- Economical best decision related to materials

- Smooth flow of materials within project
- Appropriate storage of materials as per standards
- Surplus materials handling and wastage control
- Proper use of materials on actual project site
- Proper and detailed record keeping related to materials and activities involved.

3.3 Inventory

Inventory is the stock of physical assets of the organization having economic value, which can be in various forms like raw materials, in process materials or goods, finished products or goods, general supplies, equipments and various other resources. Inventories were earlier considered to be measure of wealth and power but in current scenario due to fast development and changes in product life, inventories are considered as a potential risk which should be properly looked upon. There are basically three costs associated with inventory as follows: holding cost, stock out cost, procurement cost. In current scenario, for inventory management, inventory control, the scientific approach is practiced with use of various computer based tools.

In overall concept of inventory, the inventory control is actually a planned approach of determining what, when and how much to order and also of how much to stock so that to ensure optimum costs associated with buying, storing and utilizing. Following are the necessities of inventory control:

- For proper service to the customers.
- For continuity of productive operations.
- To ensure effective use of Capital.
- To take care of economy in purchasing.
- For reduction of risk of loss.
- To Reduce administrative workload and for administrative simplicity.

For inventory control, there are different tools available to guide the basic focus among the basic activities related to inventory control and hence overall materials management. Some of the popular techniques are as follows:

- ABC Analysis (Always Better Control)
- HML Analysis (High price, Medium price, Low price materials)
- VED Analysis (Vital, Essential, Desirable items)
- SDE Analysis (Scarce, Difficult, Easily available items)
- Economic Order Quantity (EOQ) Analysis
- Just In Time (JIT) Technique
- Perpetual inventory.

4. CONCLUSIONS

Materials management is one of the most vital systems in an organization. As far as construction related industries are concerned about 60% or more cost is

associated with materials, so to ensure proper materials use for best results, a proper materials management system should be there. In current scenario, materials management systems are being implemented in construction related organizations completely or partially. In this technically advancing era, materials management systems can also be improved by using various computer based and software based techniques. By using and improving materials management techniques that are available, construction related industries can improve economy and development in materials management and in overall organization as a whole

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