

Management of Construction Materials on Project Site

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Abstract - This study considers the construction management of the materials on building construction sites. In the study, procurement practice method of material on construction site. Construction materials management is a critical component of the construction industry. As such, the effectiveness of project execution is the organizations get to understand the major effects of techniques of proper materials management. A properly implemented materials management program can to take the flow with time of equipment and materials to the jobsite, and thus facilitate improved work face planning, productivity of labour is induced, the scheduled is better, and minimum project costs. Materials management is an essential function in terms of productivity improvement in construction projects. It is defined materials management functions which include materials and planning take off, vendor valuation and selection, purchasing, expenditure, shipping, material receiving, inventory and warehousing, and distribution of building materials. This project we have got better scheme of material management in the industries of construction to building construction projects also doing survey of industries and findout the various plane to management of construction material.

Key Word - Material Management, Construction Materials, Cost Control, Inventory Control .

I. INTRODUCTION

Management of Construction materials to be considered to the major cost component in any construction project . The total cost of used material may be 50% or more of the total cost. The aim of the management of materials is to ensure that the materials are available at their point of use when requirement hence, efficient of material's procurement represents a key role in the successful completion of the work of construction project. The contractor can get more information for considering that there may be significant difference in the date that the material was get request or date when the purchase order was made, and the time at which the material will be delivered, in this way management of materials is a key of project management "Material management is defined as the process for providing of right material on right place on right time in right quantity so as for reducing the cost of the project".

The materials management is the very important element in project of construction. Management of materials in effective construction is the main key of the success of a construction project. For many years it has to develop and make changing with respect to the complexity of the ever-growing projects. Its most important to know the origin of materials management procedures. Materials constitute a major cost component for construction Industry. Project type can be defined as the construction cost of the project dependent upon the and the extent of mechanization and plant used. To make sure a flow with time of materials is an important to involve of material management. Planning of material and inventory control technique are the two most important measures as per as Material management is concerned. This study mostly focusing on the difference between planned and actual cost of the material through S curve analysis and applying control technique of inventory so that for out of stock problems is minimized and reduced the total inventory cost.

II. PURPOSE OF MATERIAL MANAGEMENT

- Efficient material planning
- Purchasing or buying
- Storing and inventory control
- Supply and distribution of material
- Good supplier and customer relationship
- Quality assurance
- Time saving
- Reduce the cost of project

To fulfill all these purposes, it is necessary to establish harmony and good co-ordination between all the persons of department of the material management and this department would have well co-ordination with the other departments of the organization to provided to all production centers.

III. PROCESS OF MATERIAL MANAGEMENT

Material management process initiates from required on site. Then these information to store department and materials is ordered in the store, generate of indent. Process of selection of vendor is to be carried out for the best items and low value. Store department is received of the materials and investigate is carried out.

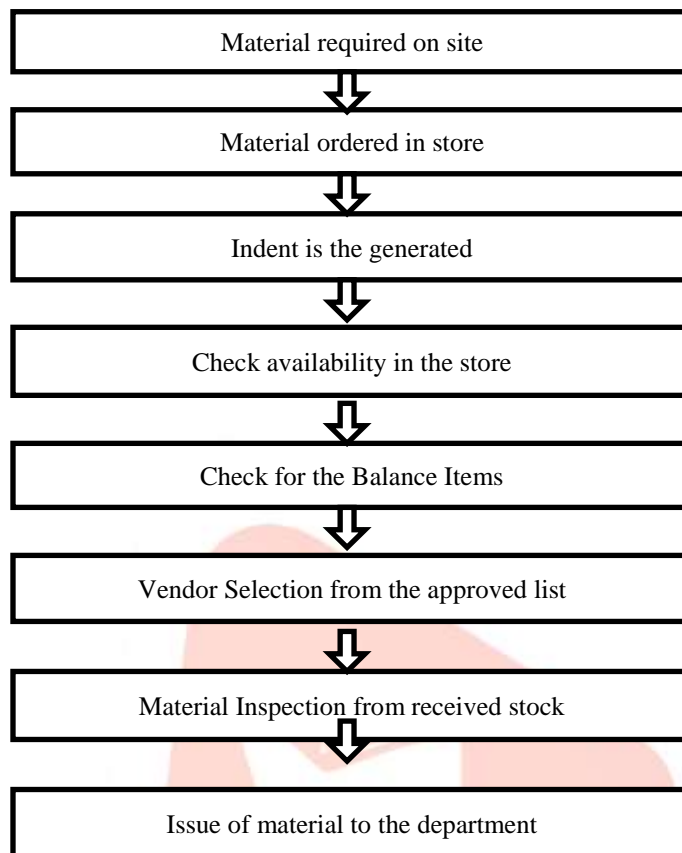


Figure 1: Process of Material Management

IV. OUTLINE OF RESEARCH WORK

Aim: The aim of this research is to explore the Management of materials of the construction on Site of the construction project and by applying the technique of the inventory control so as to analyze the material management's impact on constructions projects.

Objectives: Objectives which have covered in this project study are as follows:

- i. To Compare using MSP software by Planned Vs. Actual material consumption then to find the problems in planning, purchasing, procurement and to suggest remedies regarding the management of the material.
- ii. S Curve Analysis is findout the difference between actual and planned cost of construction material.
- iii. Reasoning over S curve Analysis.

The total cost of inventory so as to reduced by apply inventory control technique.

V. RESEARCH METHODOLOGY

In this research is investigated the present material management practices. Management of the materials is not just to effect during the stage of monitoring in which construction is taking place. Decision about procurement of the materials can also be required during preliminary planning and scheduling stage. Secondly during execution the technique of the inventory control would be monitored periodically so as to maintain flow of material to avoid the delays. This research approach, which is the combination of both the qualitative and quantitative methodologies were adopted in this research .This research have the advantage to obtain the stronger research design and achieving more valid and reliable findings. Like, interview of semi-structure and literature reviews were the methodologies conducted to carry out the research objectives. Accordingly, its believed that a detailed and deeper quality of information could be get with interview opted as the instrument of the methodology whereas questionnaire survey could cover a broad range of the study in fulfilling both objectives. Qualitative analysis: This analysis by planned and actual material for analyzing is carried out using MSP software consumption by S curve analysis. Reason over the deviations curve is the S shaped graph to take by the cumulative spending of certain parameters (cost of man-hours) against time and its the project path of representation. This analysis is determine the difference b/w planned cost and actual cost for material. This analysis is carried out to study the deviation planned and actual material cost.

Quantitative Analysis: This research mainly focuses on techniques of the Inventory Control which includes ABC analysis, EOQ analysis ABC Analysis. The technique of the ABC of the inventory control is based on the principle that a small part of the items may typically shown the bulk of value of money of the all inventory in construction process, while a relatively large number of

items may from a small part of the value of money of stores. The money value is ascertained by multiplying the quantity of material of each item by its unit price.

“A” Category – 70% to 75% of the money value are represent of the item 5% to 10%.

“B” Category– 15% to 20% of the money value are represent of the items 15% to 20%.

“C” Category –5% to 10% the value of money represent the remaining number of the items.

The relative position of these items show that items of category A should be under the maximum control, items of category B may not be given that much carefully and item C may be under a loose control.

EOQ analysis: This analysis in order size is refers by the EOQ (Economic Order Quantity) that will result are carrying costs for an item of inventory and lowest total of ordering. If a firm place unnecessary orders it will incur unusefull costs of order. If a strong places too few order, it must maintain large stocks of items and will have excessive carrying cost.

VI. REPORT ON PRESENT INVESTIGATION

1. S Curve Analysis

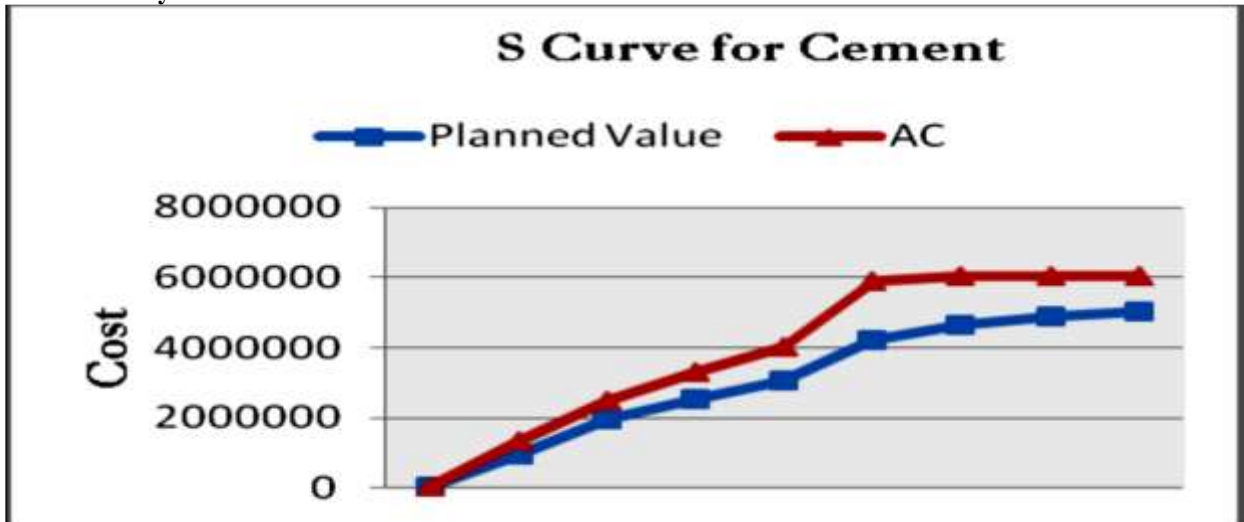


Figure 2: S Curve for Cement



Figure 3: S Curve for Steel

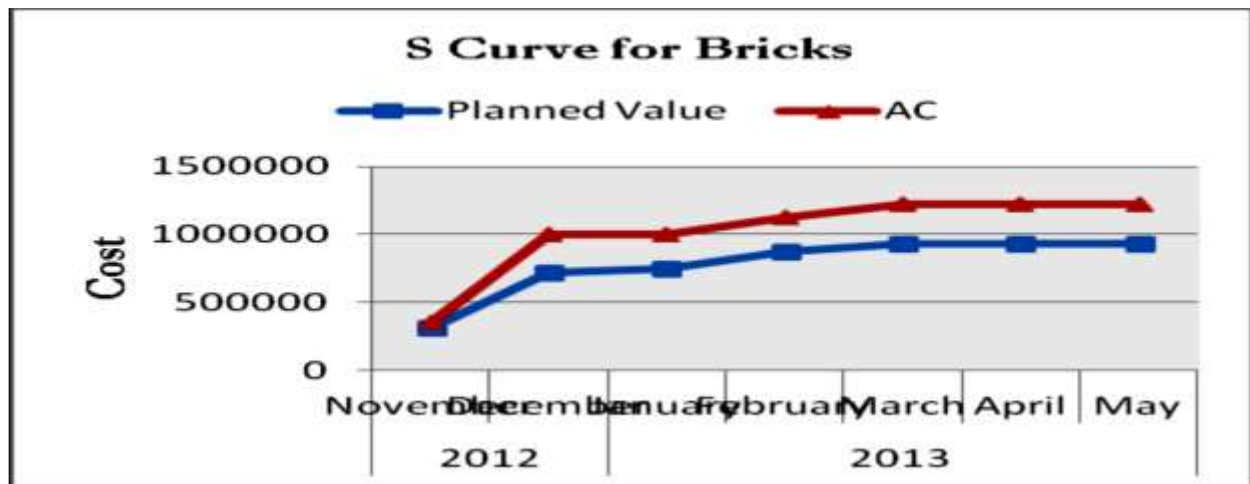


Figure 4: S Curve for Brick

Above graphs shows the comparison of cumulative cost of planned actual material. This cost is less at preliminary stage. Recognize of this S curve Analysis that there is too much increase in material cost while actual execution. By this small project but management of the material aspect never differs whether it is small or big.

VII. RESULT FROM QUANTITATIVE ANALYSIS EOQ ANALYSIS

This study in EOQ analysis is performed on Cement, Reinforcement Steel, Bricks, sand and Aggregate. While performing economic order quantity analysis Ordering Cost and Inventory Carrying Cost is assumed for all materials with practical execution procedure of construction. Inventory carrying cost incurred for inventory maintenance, Cost of Storage is include, Insurance taxes, Deterioration & obsolescence this calculates in %. **Inventory Carrying Cost = 30%.**

Economic Order Quantity is calculated by following formula

$$Q = \left(\frac{2 \times Co \times S}{Cu \times I} \right)^{\frac{1}{2}}$$

Where, Co = Cost of Ordering
S = Total Consumption
Cu = Item's cost
I = cost of carrying inventory

Table 2 : EOQ Analysis

Name of material	Annual Requirement	EOQ	No. of orders	Frequency of ordering	Total cost of Inventory using EOQ in lacs
Cement	17667	544	34	18	51.83
Steel	136 MT	16	9	19	62.16
Bricks	200000 CUM	19167	12	27	17
Sand	1215 CUM	36	39	9	9
Aggregate	271 CUM	20	13	19	26

VIII. FINDING IN ANALYTICAL

1. S Curve Analysis

There are following concluded that major causes of variations as:

- Due to unavailability of RCC Design drawings this causes problems to contractor to workout accurate actual quantities.
- Due to deviation in Items it will effect on material procurement and finally affects the total project budget.
- If the tender is quoted accurately so that non-tender will not arises because basic rate of material fluctuate day to day leading to induced in cost. At the place of quantities that item would be quoted as Rate only item so it is profitable to Client and contractor.
- Due to unusual geographical conditions in case soling extra depth of excavation to be considered.

2. EOQ Analysis:

- After EOQ analysis for cement it is concluded that economic order quantity which is 537 Bags & frequency of ordering 18 days which has overcome the problems of Stock out successfully over the actual Site stock records.
- For B class material such as sand and aggregate on site material are ordered as per requirement because of space availability they could not maintain stock as per EOQ.
- After performance of EOQ on sand & Aggregate it can be concluded that those material does not provide the satisfactory results to take ordering frequency after EOQ was 9 days & 19 days but actually on site demand is as per daily requirement

- The Total cost of inventory after adoption of economic order quantity analysis is less than without adopting economic order quantity.
- Material Manager should maintain reports such as material to order between two dates, material assignments, waste control, when to purchase construction material, when material must be on site, and purchase order between two dates.

IX. CONCLUSION

Construction material constitutes a major cost component in any construction project. The total cost of material may be 54% of total cost; so that it is important for contractor to consider that timely availability of material is potential cause of successful completion of project.

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