# Different Inventory Policies and Their Efficient Use in Construction Projects

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***Abstract-*** ***The rapid growth and development in housing as well as in infrastructure sector from last one decade continuously take place in India. electronic the cost of construction materials increased significantly in recent years and accounts for 50% to 60% of the total project cost. For the speedy constructions to be satisfy the management has to think about material procurement to its efficient supply management. As per the research its show that nearly 30-35% of increased efficiency of overall material management by implementing different modules. Now days in construction industry uses different types of materials various admixture as per their specification. Hence proper storage and supply the requisite material is important. Which can be easily achieved by material management. This paper aims to study different methods used for inventory control of materials presently practiced and used for control material waste. As material management shows direct impact on cost of project hence material management shows a major concern of overall project budgeting. In now days there are various types of Inventory Modules and policies are present in construction industry like ABC analysis EOQ modeling, policies based on ordering. This study is going to find out the role of inventory policies in construction how they benefit's overall project of waterproofing of a construction site.***

***Indexed Terms- Material management; Inventory management; ABC analysis; Construction projects***

## I. INTRODUCTION

Materials Management is a key function that is responsible for coordination of planning, sourcing, purchasing, moving, storing, and controlling materials in an optimum manner so as to provide a pre decided service to the customer at a minimum cost. Thus, materials management is an important element in project management. The materials on a project shows nearly 50% to 60% of the cost of the work, so minimizing procurement costs improve opportunities for reducing the overall project costs.

One of the most important aspects of any business is inventory management. Those who have never worked in the business sector may not understand the importance of efficient inventory management. But, the reality of it is if we don't have control of our inventory, we will be unable to ascertain you will have enough inventories on hand to handle the needs of our customers. Even worse than that, we will not have enough supplies on hand to produce the products we need to meet the needs of our customers. This requires the inventory. Without inventory management it would be difficult for any company to maintain control and be able to handle the needs of their customers. Whether you use a fulfilment company or ship products yourself you need to know where your inventory is and where it's going. Unless you can meet the needs of your customers you will soon lose all of them to competitors who are able to meet their requirements, no matter how stringent. While inventory management has always been important, it has become more important over the past several decades. As the needs of companies increase, they must in turn increase demands on their suppliers. In order for suppliers to have the goods their customers need; it is necessary for them to maintain excellent and accurate inventory management.

Inventory management is defined as the function responsible for the coordination of planning, sourcing, purchasing, moving, storing and controlling inventories in an optimum manner so as to provide a pre-decided service to the customer at a minimum cost

## II. OBJECTIVES

- To identify and study different modules and policies of Inventory Management in construction sector
- To apply ABC analysis to improve inventory management.

## III. PROBLEM STATEMENT

In the construction industry nearly half of the project cost is required for inventory. In present scenario, inventory management is underrated although its important. Both time and project cost can be minimized if inventory management is done in right way.

## IV. LITERATURE REVIEW

The research conducted by Rohan j. madgi and prof. Shashank U. Vanakudari describes about the importance of material management and of the different inventory control techniques that could be applied in order to make effective material management in the infrastructure projects. This study of the material management in different infrastructure projects and analyze the material handling process undertaken by the company and applying inventory control techniques like ABC analysis along with EOQ analysis etc. to achieve the desired results and suggest the best suitable techniques.

The study conducted by miss. Jyoti Mohopadkar, D. P. Patil elaborates different modules of inventory for reducing overall cost and increasing efficiency of project. The paper shows different techniques Including ABC analysis [always better control], FSN analysis, GOLF analysis, HML, SDF analysis. it included factors to recompile efficient inventory control. They focused to economies the buying/manufacturing cost and to keep continues eye on the pace with changing market conditions.

Further research conducted by Mr. Deepak and Dr. Mukesh Pandey shows importance of material management and its need in the construction industry. On the other half they used questionary survey to consider different needs and fault that have to be rectified using different technique of efficient management. By considering questionary survey they have applied efficient EOQ method for analysis. As per the paper study also gives very poor handling of construction materials affects the overall performance of construction projects in the terms of time, cost, quality, & productivity. This give light to the fact that pre-planning and material present are equally important in controlling the total cost of project.

## V. METHODOLOGY

1. Study of different result obtained from literature review.
2. Study of different inventory policies and modules presently practiced in construction industry.
3. Selection of construction sites for the case study.
4. Regular visits to construction site to study the daily activities related to work.
5. Communication with labors, site contractor to collect more data about different materials availability and requirement.
6. Calculation of total quantity of material required for fulfilment of waterproofing activity.
7. By considering total quantity and price description in various class by ABC analysis as per the result suggestion of ordering policy.

## VI. CASE STUDY

Requirement of materials for waterproofing Treatment to Toilet Areas at case study site residential Shaporji Palonge site hingewadi pune.

The study is conducted on the residential construction project by studying different types of materials required for waterproofing. By considering its requirement for completing project and then considering it in different policies of inventories. Its conducted based on site visiting and collecting required data by questionaries' with the site supervisors.

- Site visiting and study of different policies
- Collection of requirement of materials info
- Calculating the requirement of all materials
- Based on price and required quantity classify using ABC analysis

Inventory management policies and ABC analysis

1. Cost of carrying inventory –

It is also called as holding cost or storage cost. It is the cost incurred in maintaining stock for unit time. This carrying cost involves blocking capital that is interest rate, cost of insurance, storage cost, cost of obsolesce, deterioration cost. These costs may vary from project to project. As any work progress towards the completion the material should be present in buffer stock so in no problem situation should be maintained due to lack of materials on the path of work.

2. Cost of incurring shortages-
   We can also relate that 'we didn't have it when need the most'. It's the cost which included the cost that hampers the firm due to shortage of material. It is the cost of not having an item in stock when demanded. Cost includes shortages of every kind from materials to Labor's. There may be chances of shortage of required machinery or its one the component which directly affect the progress of work. Due to hampered work its directly delays the project as well as its shows impact on cost of the project. Due sudden stop in work the project owner gets additional losses and impact on quality of the work too. Sometimes due to delays of projects they may get penalty from their oriented structure.

3. Cost of Replenishing Inventories –
   It's the cost related to ordering of different material or machineries. This inventory includes setup of different materials. It includes the cost of material order and the cost required to transport of material from particular factories to the site of work. It also includes all the cost of different materials its order, maintenance etc. This is the cost of efforts expanded in procurement or acquisition of stock. It is generalized as a ordering cost.

4. Lot size reorder point policy:
   Its policy based on the requirement and availability of material. The main aim of the policy is to provide adequate quantity of materials. While work progress it's important to look in to availability of materials and rate on material consumption depending on work progress rate.

5. Fixed order interval scheduling policy –
   The time between the consecutive replenishment order is constant. Maximum stock level is as prescribed and inventory status is checked after every fixed interval. At each time when review is taken the order is placed as per the availability of requirement of material. That is accounting the stock. on hand plus and quantity to order to match the maximum stock level, so that there is always buffer stock of material.

6. Optimal replenishment policy-
   In this policy periodically review of inventory is taken. Aim of the policy is to provide maximum availability of material as per holding capacity of material or machineries, So each time when review took place required amount is reordered to match optimum level of material.

7. Two bin system –
   In this system there are two storage bins are provided for storage of materials. At initiation of project both bins kept fully loaded after project progress one of the bin is used for supply of particular material. After complete use of whole quantity of material from first storage bin then second bin is coming into account. After first been is emptied the material is ordered as per the capacity of bin to fulfil the first been in that time the material from second bin is used. This process is continued up to the completion of project. So in this policy one of the bin always act as a buffer until replenishment of order is received.

8. ABC analysis-
   Basic of ABC analysis is present in Pareto's law, as per pareto in large group there are significant few and insignificant many. It is like only 20% of items cost is nearly 80% of overall cost. hence these 20% are most prior and important items. In ABC analysis different materials are analyzed and their quantities are estimated by considering unit rate of material.

   Particularly Usage values are found out by estimating quantities and their unit rates, which are further converted into percent of total annual cost. Then as per the curve between percent of cost vs percent of inventory items they are further classified in following types.

Item type A – in this type accurate estimation of quantities is required. As in this type 10-20% of material constitute 70-80% of total cost. While ordering of such material senior level members are directly involved. Such material requires strict supervision and safe inventory control techniques.

Item type B - For this type of materials, Approximate forecasting of materials involvement. It requires moderate degree of control.

Item type C - These are materials which constitutes nearly 50-70% of quantity and cost almost 5-10%. While ordering of these material Junior level members shows direct rights as per the firm regulations. These materials bulk order is preferred.

## VII. RESULT FROM CALCULATIONS

This study on different inventory policies with considering different materials required for project compilations. By calculating whole quantity of materials and performing ABC analysis on them we can give relative importance between them. Depending on quantity it's easy to suggest the type of policy for efficient regulation of materials.

| Sr. no | Type of material | Total cost (Rs) | ABC class |
|---|---|---|---|
| | Damp Block 2K | 410400 | A |
| | M sand | 216000 | B |
| | Cement | 297000 | B |
| | Bricks | 234000 | B |
| | Multipurpose polymer | 40786 | B |
| | Geotextile role | 20700 | C |
| | Bath seal tape | 13800 | C |
| | Repair mortar | 52272 | C |
| | Micro concrete | 18180 | C |
| | General purpose grout | 29232 | C |
| | Total cost | 1323264 | |

(Total cost in Rupees)

Table no. I- Showing calculation of total cost and its variation in ABC class

## CONCLUSION

ABC analysis has prioritized materials which helps to provide right material at right quantity at right place about quality and quantity. Inventory study suggest different policies that Two bin system is very beneficial for the A class and some B class materials which includes Damp block 2K, Cement, Repair Mortar, MP Polymer Whereas for M sand and Brics.

For optimal replenishment policy gives benefits for ordering of general-purpose grout and bath seal tapes. These policies help to reduce overall loss of the material.

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