RESEARCHERID
THOMSON REUTERS

ISSN: 2277-9655
[Nanaware * *et al.*, 6(9): September, 2017] Impact Factor: 4.116
IC™ Value: 3.00 CODEN: IJESS7

IJESRT

INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH TECHNOLOGY

INVENTORY MANAGEMENT TECHNIQUE IN CONSTRUCTION

Miss Monika R. Nanaware & Prof. U. R. Saharkar

DOI: 10.5281/zenodo.884871

ABSTRACT

The concept of inventory management has been one of many analytical aspects of management. This involves optimizing the resources available to store various materials. Lack of inventory may lead to stock-outs, resulting in production downtime, but a very high inventory on the other hand may lead to an increase in production costs due to the high cost of inventory transport. Thus, inventory optimization should ensure that stocks are neither too low nor too high. Stocks such as finished products, work in progress, components, raw materials, stores, spare parts, etc. Represent 80% or more of working capital in some of the representative industries studied in the past. It would appear that any effort to rationalize inventories can lead to substantial savings. For example, a scientific control system can dramatically reduce investment in stocks, sometimes up to 50 percent or even more. This paper deals with ABC and EOQ Analysis of Construction Company and finally concluding section, project provides detail of financial analysis of effective utilization of inventory models in material management for cost reduction

KEYWORDS: Inventory Management, ABC and EOQ Analysis, Financial Analysis, Material Management.

I. INTRODUCTION

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. Without stock management, it would be difficult for any company to maintain control and to handle customer needs. Regardless of whether you are delivering a performance company or products, you need to know where your inventory is and where you are going. Unless you meet your customers' needs, you may soon lose all competitors who are able to meet your requirements, regardless of whether they are strict. Although inventory management has always been important, it has become increasingly important over the last few decades. As companies' needs grow, they need to increase demand from suppliers. In order for suppliers to have customers' goods, it is necessary 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. 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.

II. NEED OF THE PROJECT WORK

The importance of materials management in construction can be achieved due to the fact that from 50% to 60% of the total cost of the project materials and management are. The survey shows that the average material cost is 64% (from 50% to 65%) of the implementation price, and only 36% of the costs go to salaries, overhead and profits, etc.

Therefore, the importance of material management is that any significant contribution made by the material manager in reducing material costs will be of great importance to improve profitability and the rate of return on investment.

III. OBJECTIVE

Study and analysis various inventory control systems, inventory models useful for day to day material management.Application of inventory control technique on actual case study and minimize the project cost.Discussion and suggestion for Inventory cost control techniques.

IV. LITERATUREREIVIEW

According to the van Horne (1989), a company should introduce policies to reduce lead time, regulate usage and thus minimize safety status. Therefore the finance manager should ensure that only an optimum amount is invented in inventory to achieve the trade of between profitability and liquidity. Materials management is there a managerial process of counting planning, coordinating, control, monitoring and motivation.

According to T. PhaniMadhavi(2013)procurement process involved in material management and launch a continuous improvement was developed and applied. Material is the main component in any of the construction projects. Therefore, if the material management in construction projects is not managed properly it will create a major project cost variance. The total cost of the project can be well controlled by taking corrective actions towards the cost variance occur in the project.

According to Dinesh Dhoka (2013), Inventory Classification is very important to manage inventory efficiently. For inventory optimization and Inventory Forecasting, products need to be classified appropriately. There are several methods used for categorization of products and items in inventory. ABC Analysis is based on Pareto Analysis which says 20% of the items contribute to 80% of sales. It implies that a small portion of items in Inventory contribute to maximum sales. Typically less than 20% of items classified as A, contribute as much as 80% of the revenue. The next 15% (80% - 95%) contribution to revenue is done by B class Items. The last 5 % revenue is generated by items classified as C'. As the classification is done according to the importance of their relative value, this approach is also known as Proportional Value Analysis.

As per Prof. Anup Wilfred (2015), if the material management is not properly managed it will create a project cost variance. Project cost can be controlled by taking corrective actions towards the cost variance. Material management deals with principles and practices which effectively optimizes cost of materials used in the project. Material management is the line of responsibility which begins with the selection of suppliers and ends when the material is delivered to its point.ABC analysis helps in rationalizing the number of orders and reduces the overall inventory even though overall purchase orders are the same, the average inventory can be reduced substantially. The Cost Variance values for the Class A materials is a tool to measure the profit and it has a positive value. It indicates the project has a cost under run i.e. the cost incurred is less than the planned or budgeted cost. This S Curve analysis recognizes that there is too much increase in material cost during actual execution.

V. METHODOLOGY AND CASE STUDY ANALYSIS

Study evolves importance of inventory cost & its relation with project cost. Further it provides detail study of inventory control systems, inventory models & effective utilization of it for reduction of inventory cost.After going through all reference document and literature project lead ahead with typical case study of construction project inventory management.Analysis is carried analyzing planned and actual material consumption through techniques.Based on the methodology above the case study is carried out and outputs are drawn. Case study is construction of building in Maharashtra state.

Mechanism Of ABC Analysis

The mechanics of classifying the items into 'A', 'B' and 'C' categories is described in the following steps:

i) Calculate rupee annual issues for each item in inventory by multiplying the unit cost by the number of units issued in a year. It is assumed that the issues and consumption are the same.
ii) Sort all items by rupee annual issues in descending sequence.
iii) Prepare a list from these ranked items showing item no. , unit cost, annual units issued and annual rupee value of units issued.
iv) Starting at the top of the list, compute a running total, item-by-item issue value and the rupee consumption value.
v) Compute and print for each item the cumulative percentages for the item count and cumulative annual issue value.

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

The normal items in most organizations show the following pattern:

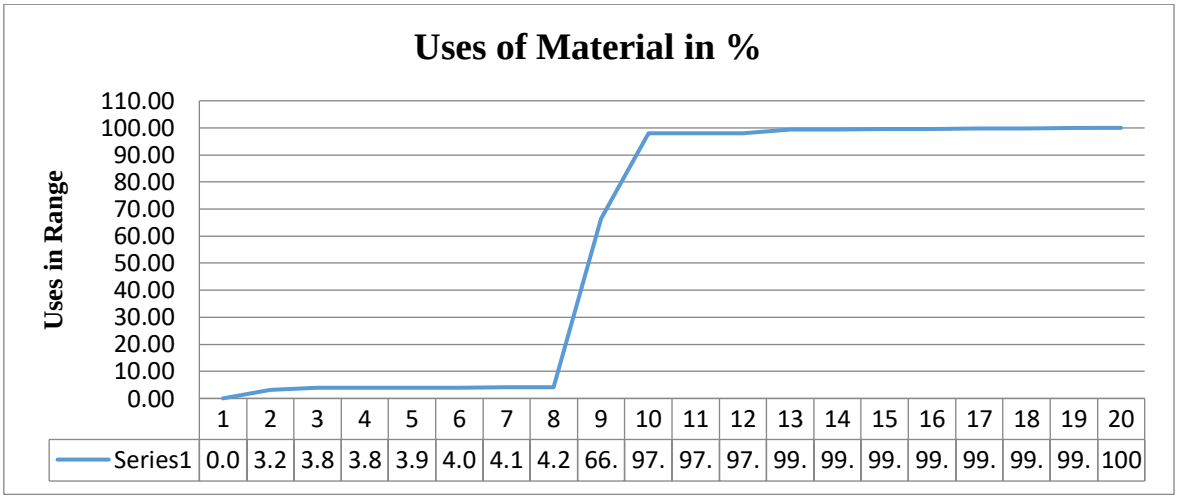
i) 5 per cent to 10 per cent of the top number of items account for about 70 per cent of the total consumption value. These items are called 'A' items.
ii) 15 per cent to 20 per cent of the number of items account for 20 per cent of the total consumption value. These items are called 'B' items.
iii) The remaining number of items account for the balance 15 per cent of the total issue value. These items are called 'C' items.

Table 1. ABC Analysis for a Construction Project

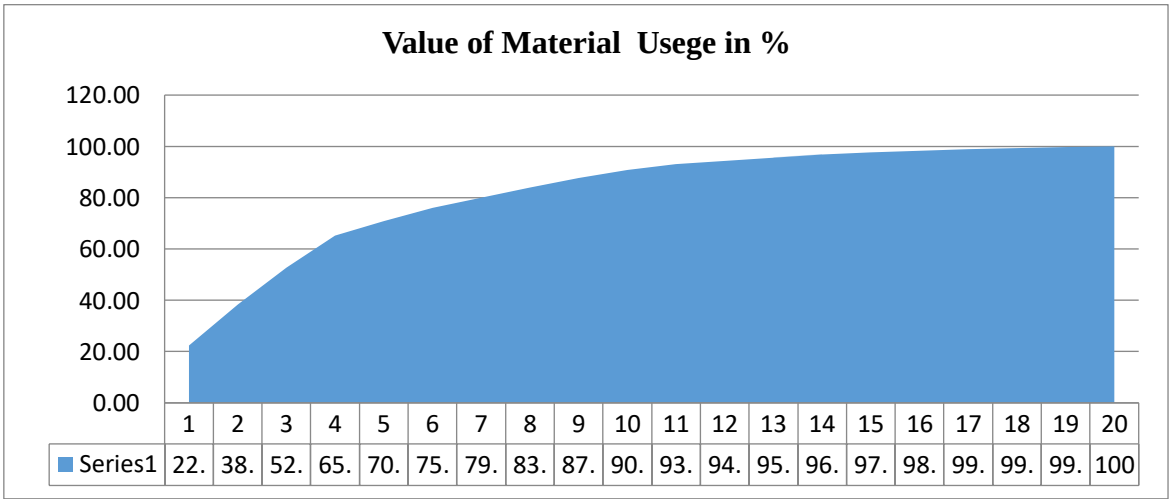
Sr. No.	Item Description	Unit Per	Annual usage	Usage %	Cumulative Item %	Rate Per	Value	% Usage Value	Cumulative % Usage Value	Material Type
1	Steel	Ton	239.90	0.03	0.03	34393	8250775.00	22.46	22.46	A TYPE MATERIAL
2	Cement	Bags	23515.00	3.20	3.23	250	5878750.00	16.00	38.47	
3	Flooring	Sq. Feet	4677.19	0.64	3.87	1121	5243232.00	14.27	52.74	
4	Plumbing (Int Ext)	Nos	0.00	0.00	3.87	4567503	4567503.00	12.43	65.18	
5	S.S. Railing	Ton	799.65	0.11	3.97	2583	2065834.00	5.62	70.80	
6	Windows, Ventilators	Nos	566.03	0.08	4.05	3344	1892591.00	5.15	75.95	B TYPE MATERIAL
7	River Sand	Brass	491.00	0.07	4.12	3000	1473000.00	4.01	79.96	
8	Crush Sand	Brass	722.50	0.10	4.22	2000	1445000.00	3.93	83.90	
9	4"Red Bricks	Nos	457533.00	62.22	66.43	3	1372599.00	3.74	87.63	
10	6" Fly Ash Bricks	Nos	231502.00	31.48	97.91	5	1157510.00	3.15	90.78	
11	Electrical Materials	Nos	0.00	0.00	97.91	870000	870000.00	2.37	93.15	C TYPE MATERIAL
12	Aggregate (Metal)	Brass	282.50	0.04	97.95	1600	452000.00	1.23	94.38	
13	M.S. Grill	Ton	10607.47	1.44	99.39	42	445514.00	1.21	95.60	
14	Doors	Nos	408.22	0.06	99.45	1060	432768.00	1.18	96.77	
15	CP Fittings	Nos	916.00	0.12	99.57	315	288240.00	0.78	97.56	
16	Sanitary Fittings	Nos	336.00	0.05	99.62	840	282371.00	0.77	98.33	
17	Painting	Liter	944.67	0.13	99.75	265	250348.00	0.68	99.01	

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

18	Rubble Soling	Brass	162.00	0.02	99.77	869	140800.00	0.38	99.39	
19	Lime	Bags	1428.00	0.19	99.96	85	121380.00	0.33	99.72	
20	Murum	Brass	254.00	0.03	100.00	400	101600.00	0.28	100.00	
	Total =		**735385.12**				**36731815.0**			



Graph 1. Showing Distribution of Materials Usage on the basis of ABC



Graph2. Showing Distribution of Materials Value on the basis of ABC

EOQ analysis for a Building

Economic order quantity is the order quantity of inventory that minimizes the total cost of inventory management. Two most important categories of inventory cost are ordering costs and carrying costs. Ordering costs are costs that are incurred on obtaining, additional inventories. They include costs incurred on communicating the order, transportation cost, etc. Carrying costs incurred on holding inventory in hand. This includes Cost of Storage, Insurance taxes, Deterioration & obsolescence this calculates in %. Inventory Carrying Cost = 20%

Economic Ordering Quantity = $\sqrt{(2DS/H)}$

D= Annual Demand (units)

S=Cost per Order

H=Annual Carrying cost per unit

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

Table.2Cost Differences for Constructions Project

Description	Without Material Management	With Material Management
Total Cost of A Project(Rs.)	56046851	54877851
Estimated Cost For Materials	32848438	-
Total Cost Required for Materials(Rs.)	35287270	34118270
% Cost Consumption By Materials.	62.96%	60.87%
Total Cost of A Project Without Materials(Rs.)	17706941	
Difference In The Cost(Rs)	840455	
% Cost Saved of Materials	2.09%	

VI. CONCLUSION

1. Inventory management can be done effectively by using ABC analysis and EOQ.
2. The implementation of ABC analysis gives the distribution of A, B, C type materials. This distribution of materials gives the Economical importance of materials.
3. EOQ gives the results of right quantity of orders at right time. It avoids the delays in material supply and also avoids wastage of materials.
4. Inventory control system minimizes the wastage of materials which ultimately saves the cost of a project.

VII. ACKNOWLEDGMENT

I express my profound gratitude toward respected guide Prof. Upendra Saharkar, for his constant encouragement and valuable guidance during completion of my Project report. They have been a strong and moral support to me throughout this work.

I take opportunity to thank our PG coordinator Prof. Hemant Salunke, and all the Staff members of CIVIL (PG) department for their co-operation & help during this work. I am also thankful to Prof. Dr. Ushadevi. S. Patil, for her constant encouragement to get new ideas for seminar topic and references

VIII. REFERENCES

[1] Ashwini R. Patil, Smita V. Pataska , "Analyzing Material Management Techniques on Construction Project" International Journal of Engineering and Innovative Technology Volume 3, Issue 4, October 2013.
[2] AdityaPande, "Material Management For Construction Site –A Review" Master Student, (M.E.Const.Engg. & Management) P.R.M.C.E.A.M
Badnera, Assistant Professor, Civil Engg.Deptt. P.R.M.C.E.A.M Badnera. Volume 1 Issue 5, PP 1-7
[3] T. PhaniMadhavi, "Material Management In Construction – A Case Study" International Journal of Research In Engineering And Technology, Nov-2013.
[4] L.C. Bell, G. Stukhart "Attributes of material management systems", ASCE, Vol.112, No. 1, March 1986
[5] Carlos H. Caldas,"Materials Management Practices in the Construction Industry" Practice Periodical on Structural Design and Construction, © ASCE, ISSN 1084-0680/04014039(2008).
[6] AshwiniArunSalunkhe, Rahul S. Patil, "Effect Of Construction Delays On Project Time Overrun Indian Scenario" : International Journal of Research in Engineering and Technology Volume: 03 Issue: 01, Jan-2014

[7] G.Kanimozhi, P.Latha, "Material Management In Constuction Industry" Indian Journal Of Applied Research X 1 Volume : 4 , Issue : 4 , Special Apr Issue 2014
[8] D. Dhoka and Y. Lokeswara, " ABC Classification for Inventory Optimization," IOSR Journal of Business and Management (IOSR-JBM), Volume 15, Issue 1 Nov. - Dec. 2013), PP 38-41.
[9] Dr.G.Brindha, "Inventory Management", International Journal of Innovative Research in Science, Engineering and TechnologyVol. 3, Issue 1, January 2014 PP 8163-8176
[10] Prof. Anup Wilfred, "An Empirical Case Study Of Material Management In Residential Project", International Research Journal of Engineering and Technology, Volume: 02 Issue: 04 | July-2015 PP 1116-1119
[11] RakeshNayak , Rakesh Gupta, MukeshPandey, "Management of Construction Materials on Project Site", IJEDR Volume 4, Issue 2, 2016 PP 1062-1066.

CITE AN ARTICLE

Nanaware , M. R., Miss, & Saharkar, U. R., Prof. (2017). *INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH TECHNOLOGY*, *6*(9), 225-230.