Application of Inventory Management System in Small Scale Industry

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Abstract – *Inventory management system involves procurement, storage, identification, retrieval, transport and construction methods. Each is indelibly linked to safety, productivity and schedule performance. The main objective of Our study is to analyze the inventory management control adopted and the effective operation of inventory at the construction site. ABC analysis is one of the conventionally used approaches to classify the inventories and the case study of a company is collected. 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. The notion of inventory management has been one of the many analytical aspects of management. It involves optimization of resources available for holding stock of a range of materials. Lack of inventory can lead to stock-outs, causing stoppage of production, but a very high inventory on the other hand can result in increased cost of production due to high cost of carrying inventory. Thus optimization of inventory should ensure that stocks are neither too low nor too high. Inventories like finished products, work-in-progress, components, raw materials, stores, spares, etc.*

Key words: *Inventory management system, ABC and EOQ Analysis,*

1. INTRODUCTION

In recent time, attention was focused on the development of suitable mathematical tools and approaches designed to aid the decision-maker in setting optimum inventory levels. Economic order quantity model (EOQ) has thus been developed to take care of the weaknesses emanating from the traditional methods of inventory control and valuation, which to some extent has proved useful in optimizing resources and thus, minimizing associated cost. Financial analysts have sounded enough warning on the danger expose to the long run profitability as well as continuity of business concern when its inventories are left unmanaged. First, a company, which neglects it management of inventory, runs the risk of production bottlenecks and subsequently unable to maintain the minimum investment it requires to maximized profit. Second, inventories that are inefficiently managed may apart from affecting sales create an irreparable loss in market for companies operating in highly competitive industry. Invariably, a company must neither keep excess inventories to avoid an unnecessary tying down of funds as well as loss in fund due to pilferage, spoilage and obsolescence nor maintain too low inventories so as to meet production and sales demand as at when needed. Therefore, the mere fact that ineffective inventory management affects virtually the organizational objectives necessitates this type of research work. The researcher has taken Nigeria Bottling Company as a case study so as to clearly see if their resounding success can be attributed to the kind of inventory system the company embarks on. Since their production process requires a lot of raw materials and despite the economic condition of the country at any given time, production has never ceased and their products have never been scarce

1.1. Inventory Management

The term 'inventory' originates from the French word 'Inventaire' and Latin word 'Inventariom", which implies a list of things found. The term 'inventory' can be defined as, "The term inventory includes materials like – raw, in process, finished packaging, spares and others; stocked in order to meet an unexpected demand or distribution in the future." Inventory includes the following categories of items:

a. Production Inventories: Raw materials, parts and components which enter the firm's product in the production process. These may consist of two types – special items manufactured to company specifications and standard industrial items purchased 'off the shell'.

b. MRO Inventories: Maintenance, Repair, and Operating supplies which are consumed in the production process but which do not become the part of the product. (e.g. lubricating oil, soap, machine repair parts)

c. In-process Inventories: Semi-finished products found at various stages in the production operation. d. Finished goods Inventories: Completed products ready for shipment.

1.2. Key Performance Indicators For Measuring Construction Success

Most industries are dynamic in nature and the construction industry is no exception. Its environment has become more dynamic due to the increasing uncertainties in technology, budgets, and development processes. A building project is completed as a result of a combination of many events and interactions, planned or unplanned, over the life of a facility, with changing participants and processes in a constantly changing environment. Temporary, fragment and short-term are also significant characteristics inherent in the construction industry. Such characteristics greatly affect the effectiveness of project team, especially the project managers. The concept of project success is developed to set criteria and standards by which project managers can complete projects with the most favourable outcomes. However, this concept has remained ambiguously defined among construction professionals. Many project managers still attend to this topic in an intuitive and ad hoc fashion as they attempt to manage and allocate resources across various project areas. Although a number of researchers had explored this concept, no general agreement has been achieved. Project success means different things to different people. The criteria of project success are constantly enriched. Therefore, a systematic critique of the existing literature is needed to develop framework for measuring construction success both quantitatively and qualitatively. (Refer Albert P.C. Chan et. al. 2004)

2. LITERATURE REVIEW

1. "Rethinking Trust In Construction Contract Formation: Dispute Resolution Method Selection", (2016)

Low trust negatively affects the efficiency, schedule performance, and administrative cost functions of construction project team. However, trust is seldom taken into consideration during contract formation; in particular, in the dispute resolution method (DRM) clauses. The objective of this paper is to investigate how trust influences contract terms and conditions related to the DRM clauses. Data from 27 construction projects were collected and 11 DRM experts participated in the study. The results show that although expert recommend the choice of DRMs based on the trust level between parties, the DRM really used on construction projects is not affected by the trust level between partners. Negotiation was the most recommended DRM for high-trust projects, but was the least used DRM in practice on such projects. The conclusion of this investigate is an incremental step to rethink social factors that are overlooked in construction management and that proved influential on how contracts are drafted.

2. "Modelling And Analysis Of Inventory Management Systems In Healthcare: A Review And Reflections" (2019)

Inventory management in a healthcare system needs to be compatible with its operations and Critical characteristics ensuring minimization of inventory-related cost as well as maximization of service level with a significant reduction in the price of treatment and wastage of resources. Over the years, numerous approaches and methodologies have been developed by the researchers and practitioners for modelling and analysis of varieties of inventory management systems in the healthcare sector considering these aspects. In this paper, the existing modelling approaches and solution methods concerning inventory systems in healthcare are classified and critically reviewed. An integrated research framework as applicable in the present context is presented as a direct consequence of the review of the literature with future research directions.

3. "Research On Construction Schedule Management Based On Bim Technology" (2017)

The construction schedule management in the traditional mode will be affected by the natural environment, the objective environment and the subjective environment, leading to the interruption or obstruction in the construction process. But in the actual construction process, through assisting the BIM model and BIM5D software in the construction schedule management, not only ahead of schedule can be aware of the next step schedule of the required resource requirements, equipment demand and capital requirements; but also in the actual construction process Timely monitoring the progress of the completion of the percentage of the plan, the actual use of the amount of funds accumulated and the amount of budgetary funds deviation and so on; at the same time in the actual construction process can form a set of complete construction schedule management mode that timely supervising the construction quality and safety issues, recording defects on the spot, integrating data and associating model, timely rectifying or Repairing defects, and then checking the project.

3. INVENTORY MANAGEMENT AND BENCHMARKING PROCESS

3.1. Inventory Management - Definition and Concepts

There is need for installation of a proper inventory control technique in any business organization in developing country in India, inventory management refers to all the activities involved in developing and managing the inventory levels of raw materials, semi-finished materials and finished good so that adequate supplies are available and the costs of over or under stocks are low. The cost of maintaining inventory is included in the final price paid by the consumer. Good in inventory represents a cost to their owner. The manufacturer has the expense of materials and labor. [11]

Inventory as a stock of possessions is maintained by a business in expectation of some of the future demand. This definition was also supported who stressed that inventory management has an impact on all business functions, particularly operations, marketing, accounting, and finance. He established that there are three motives for holding inventories, which are transaction, precautionary and speculative motives. [11] The transaction motive occurs when there is a need to hold stock to meet production and sales requirements. A firm might also decide to hold additional amounts of stock to cover the possibility that it may have under estimated its future production and sales requirements. This represents a precautionary motive, which applies only when future demand is uncertain. The speculative motive for holding inventory might entice a firm to purchase a larger quantity of materials than normal in anticipation of making abnormal profits. Advance purchase of raw materials in inflationary times is one form of speculative behavior.

3.1.1. Inventory Model: The Economic Order Quantity (EOQ) Model

Undoubtedly, the best-known and most fundamental inventory decision model is the Economic Order Quantity Model. Its origin dated back to the early 1900s. The purpose of using the EOQ model in this research is to find out the particular quantity, which minimize total inventory costs that are the total ordering and carrying costs.

3.1.2. EOQ Assumptions

The EOQ has been previously defined as the ordering quantity which minimizes the balance of cost between inventory holding cost and re-order costs. Stressed further that to be able to calculate a basic EOQ, certain assumptions are necessary:

(i) That there is a known, constant, stock holding costs;

(ii) That there is a known, constant ordering costs;

(iii) That the rates of demand are known

(iv) That there is a known constant price per unit

(v) That replenishment is made instantaneously, that is the whole batch is delivered at once.

(vi) No stock-outs are allowed

It would be apparent that the above assumptions are somewhat sweeping and that they are a good reason for treating an EOQ calculation with caution.[11] Also, the rationale of EOQ ignores buffer stocks, which are maintained to cater for variations in lead-time and demand. The above assumptions are wide ranging and it is unlikely that all could be observed in practice. Nevertheless, the EOQ calculation is a useful starting point in establishing an appropriate reorder quantity. The EOQ formula is given below; it's derivation and graphical presentation.

$$EOQ = \frac{2C_O D}{C_C} \text{ ....(1)}$$

Where

Co, Cc and D denote the ordering costs, carrying cost and annual demand respectively.

$$Annual\ stock = \frac{Q}{2}$$

$$Total\ annual\ carrying\ cost = \frac{C_C Q}{2}$$

$$No.\ of\ order\ per\ annum = \frac{D}{Q}$$

$$annual\ Ordering\ \ cost = \frac{C_O D}{Q}$$

$$Total\ \ cost = \frac{C_C Q}{2} + \frac{C_O D}{Q} \text{ ....(2)}$$

The EOQ formula is given below; it's derivation and graphical presentation.

$$EOQ = \frac{2C_O D}{C_C}$$

Graphically, the EOQ can be represent in the Figure

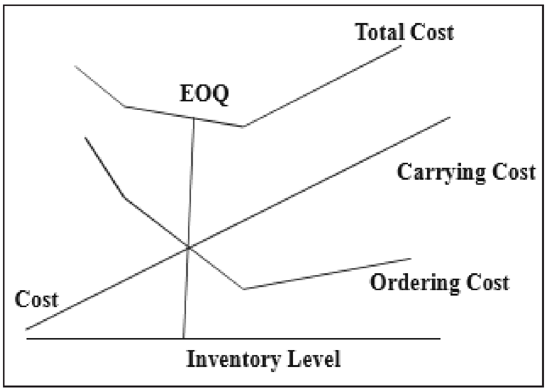

Fig - 1. Presentation of EOQ graphically

3.2. Process of Inventory Management and Control

Inventory management and control refers to the planning for optimum quantities of materials at all stages in the production cycle and evolving techniques which would ensure the availability of planned inventories. Following four steps are involved in the process:

a. Determination Of Optimum Inventory Levels And Procedures Of Their Review And Adjustment:

It is a significant step but a difficult one. Too much inventory results in locking up of working capital accompanied by increased carrying costs (but reduced ordering costs). Excess inventories, however, guarantee uninterrupted supply of materials and components, to meet production schedules and finished goods to meet customers demand. Too less of inventory releases working capital for alternative uses and reduces carrying costs and increases ordering costs. But there is the risk of stock out costs.

b. Determination Of The Degree Of Control That Is Required For The Best Results:

The second aspect of inventory management is to decide just how much control is needed to realize the objectives of inventory management. The difficulty is best overcome by categorization of inventory on the basis of value. Popularly called the ABC categorization, this approach is useful in deciding the degree of control. 'A' class items are 'high' in value but 'low' in quantity, 'C' class inventories are the opposite of 'A' group i.e. 'high' in quantity and 'low' in value. In between are the 'B' group stocks which are more or less equal in quantity and value proportion to the total inventory. Tight control is exercised on 'A' category items through accurate records of receipts and issues and by co-ordination of incoming shipments with production managements.

c. Planning and design of the Inventory control system:

An inventory system provides the organizational structure and the operating policies for maintaining and controlling goods to be inventoried. The system is responsible for ordering and receipt of goods, timing the order placement, and keeping track of what has been ordered, how much, and from whom.

d. Planning of the Inventory control organization:

It is yet another important aspect of inventory management because choosing the panel to control is very difficult.

3.3. Inventory Control Techniques

Inventory control techniques are employed by the inventory control organization within the framework of one of the basic inventory models, viz., fixed order quantity system or fixed order period system. Inventory control techniques represent the operational aspect of inventory management and help realize the objectives of inventory management and control. Several techniques of inventory control are in use and it depends on the convenience of the firm to adopt any of the techniques. What should be stressed, however, is the need to cover all items of inventory and all stages, i.e. from the stage of receipt from suppliers to the stage of their use. The techniques most commonly used are the following:

3.3.1. ABC Analysis:

ABC analysis is a business term used to define an inventory categorization technique often used in materials management. It is also known as 'Selective Inventory Control.' ABC analysis provides a mechanism for identifying items which will have a significant impact on overall inventory cost. Whilst also providing a mechanism for identifying different categories of stock that will require different management and controls. When carrying out an ABC analysis, inventory items are valued (item cost multiplied by quantity issued/consumed in period) with the results then ranked. The results are then grouped typically into three bands. These bands are called ABC codes.

3.3.2. ABC Codes

"A class" inventory will typically contain items that account for 80% of total value, or 20% of total items. "B class" inventory will have around 15% of total value, or 30% of total items. "C class" inventory will account for the remaining 5%, or 50% of total items. ABC Analysis is similar to the Pareto principle in that the "A class" group will typically account for a large proportion of the overall value but a small percentage of the overall volume of inventory

3.3.3. High, Medium and Low Classification:

The High, medium and Low (HML) classification follows the same procedure as is adopted in ABC classification. Only difference is that in HML, the classification unit value is the criterion and not the annual consumption value. The items of inventory should be listed in the descending order of unit value and it is up to the management to fix limits for three categories. The HML analysis is useful for keeping control over consumption at departmental levels, for deciding the frequency of physical verification, and for controlling purchases Procurement department is more concerned with prices of materials so this analysis helps them to take them the decisions such as, who will procure what based on the hierarchy and price of material.

3.3.4. VED Classification:

While in ABC, classification inventories are classified on the basis of their consumption value and in HML analysis the unit value is the basis, criticality of inventories is the basis for vital, essential and desirable categorization. The VED analysis is done to determine the criticality of an item and its effect on production and other services. It is specially used for classification of spare parts.

3.3.5. SDE Classification:

The SDE analysis is based upon the availability of items and is very useful in the context of scarcity of supply. In this analysis, items, generally imported, and those which are in short supply. It refers to difficult items which are available indigenously but are difficult items to procure. Items which have to come from distant places or for which reliable suppliers are difficult to come by fall into category. It also refers to items which are easy to acquire and which are available in the local markets.

3.3.6. FSN Classification:

FSN stands for fast moving, slow moving and non-moving. Here, classification is based on the pattern of issues from stores and is useful in controlling obsolescence. To carry out an FSN analysis, the date of receipt or the last date of issue, whichever is later, is taken to determine the number of months, which have lapsed since the last transaction. The items are usually grouped in periods of 12 months.FSN analysis is helpful in identifying active items which need to be reviewed regularly and surplus items which have to be examined further. Non-moving items may be examined further and their disposal can be considered.

3.3.7. SOS Analysis:

'S' stands for Seasonal items and 'O Sstands for off-seasonal items. It may be advantageous to buy seasonal items at low prices and keep inventory or buy at high price during off seasons. Based on the fluctuation in prices and availability, suitable decision has to be taken regarding how much to purchase and at what prices.

3.3.8. XYZ Analysis:

XYZ analysis is calculated by dividing an item's current stock value by the total stock value of the stores. The items are first sorted on descending order of their current stock value. The values are then accumulated till values reach say 60% of the total stock value. These items are grouped as 'X'. Similarly, other items are grouped as 'Y' and 'Z' items based on their accumulated value reaching another 30% & 10% respectively. The XYZ analysis gives an immediate view of which items are expensive to hold. Through this analysis, firm can reduce its money locked up by keeping as little as possible of these expensive items.

3.3.9. GOLF Analysis:

This stands for Government, Open market, Local or Foreign source of supply. For many items imports are canalized through government agencies such as State Trading Corporations, Mineral and Metals Trading Corporations, Indian Drugs and

Pharmaceuticals etc. For such items, the buying firms cannot apply any inventory control techniques and have to accept the quota allotted by the Government. 'Open market' categories are those who form bulk of suppliers and procurement is rather easy. 'L' category includes those local suppliers from whom items can be purchased off the – shell on cash purchase basis. 'F' category indicates foreign suppliers. Since an elaborate import procedure is involved, it is better to buy imported items in bigger lots usually covering the annual requirements.

3.3.10. Economic Order Quantity:

Economic order quantity is the level of inventory that minimizes the total inventory holding costs and ordering costs. It is one of the oldest classical production scheduling models. The framework used to determine this order quantity is also known as Wilson EOQ Model or Wilson Formula. The model was developed by F. W. Harris in 1913. But still R. H. Wilson, a consultant who applied it extensively, is given credit for his early in-depth analysis of the model. EOQ is essentially an accounting formula that determines the point at which the combination of order costs and inventory carrying costs are the least. The result is the most cost effective quantity to order. In purchasing this is known as the order quantity, in manufacturing it is known as the production lot size.

An organization wants to determine the optimal number of units of the product to order so that it minimize the total cost associated with the purchase, delivery and storage of the product The required parameters to the solution are the total demand for the year, the purchase cost for each item, the fixed cost to place the order and the storage cost for each item per year. It is worth noteable that the number of times an order is placed will also affect the total cost; however, this number can be determined from the other parameters-

- The ordering cost is constant.
- The rate of demand is constant
- The lead time is fixed
- The purchase price of the item is constant i.e. no discount is available

The replenishment is made instantaneously; the whole batch is delivered at once. EOQ is the quantity to order, so that ordering cost + carrying cost finds its minimum

4. RESULT AND DISCUSSION

4.1 ABC Analysis for a Building

Table 1: Calculation For Distribution Of Materials On The Basis Of ABC Building C

SrNo	Item Description	Unit of material	Annual Usage	Usage %	Cumulative Item %	Rate /Unit	Value	% Usage Value	Cumulative % Usage Value	Material Type
1	Cement	Bags	1343.5	48.0	48.0	380	510530	19.49	19.49	A
2	Sand	cum	70	2.5	50.5	5000	350000	13.36	32.85	
3	Aggregate	cum	82.9	3.0	53.5	4500	373050	14.24	47.08	
4	Steel	Ton	9.95	0.4	53.8	45500	452725	17.28	64.36	
5	Flooring	cum	175.42	6.3	60.1	951.8	166964.756	6.37	70.74	
6	Brickwork	cum	66.577	2.4	62.5	5500	366173.5	13.98	84.71	B
7	Murum Filling	cum	59.333	2.1	64.6	550	32633.15	1.25	85.96	
8	Granite Ota	nos	1	0.0	64.7	37000	37000	1.41	87.37	
9	Oil Paint	Sqm	288.756	10.3	75.0	190	54863.64	2.09	89.47	C
10	Cement Paint	Sqm	205.65	7.4	82.3	140	28791	1.10	90.56	
11	Plastering	sqm	494.406	17.7	100.0	500	247203	9.44	100.00	
	Total		2797.492				2619934.05			

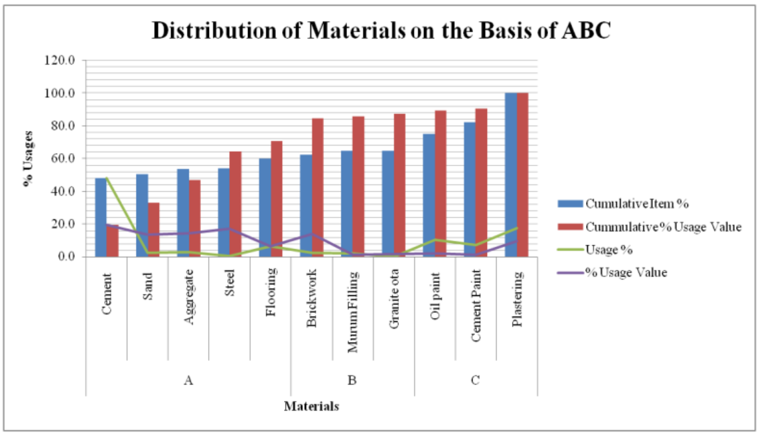

Fig - 2. Distribution Of Materials On The Basis Of ABC Building C

From above the results it is observed that distribution of materials of ABC analysis in building C. Here annual used material is divided in A, B, C caterigories. Results observed maximum 70.64%, 16.64%, 12.63% material are covered under category 'A', 'B', 'C' respectively.

Table 2: Calculation For Distribution Of Materials On The Basis Of ABC Building P

SrNo	Item Description	Unit of material	Annual Usage	Usage %	Cumulative Item %	Rate /Unit	Value	% Usage Value	Cumulative % Usage Value	Material Type
1	Cement	Bags	2464.1	58.1	58.1	380	936367.128	21.18	21.18	A
2	Sand	cum	128.3	3.0	61.1	5000	641698.964	14.51	35.69	
3	Aggregate	cum	122.9	2.9	64.0	4500	553258.865	12.51	48.20	
4	Steel	ton	15.4	0.4	64.4	45500	699790	15.83	64.03	
5	Flooring	cum	307.348	7.2	71.6	951.8	292533.826	6.62	70.65	
6	Brickwork	cum	156.164	3.7	75.3	5500	858902	19.43	90.07	B
7	Murum Filling	cum	72.05	1.7	77.0	550	39627.5	0.90	90.97	
8	Granite Ota	nos	2	0.0	77.1	37000	74000	1.67	92.64	C
9	Oil Paint	Sqm	276.9942	6.5	83.6	190	52628.898	1.19	93.83	
10	Cement Paint	Sqm	209.544	4.9	88.5	140	29336.16	0.66	94.50	
11	Plastering	sqm	486.486	11.5	100.0	500	243243	5.50	100.00	
	Total		4241.4				4421386.34			

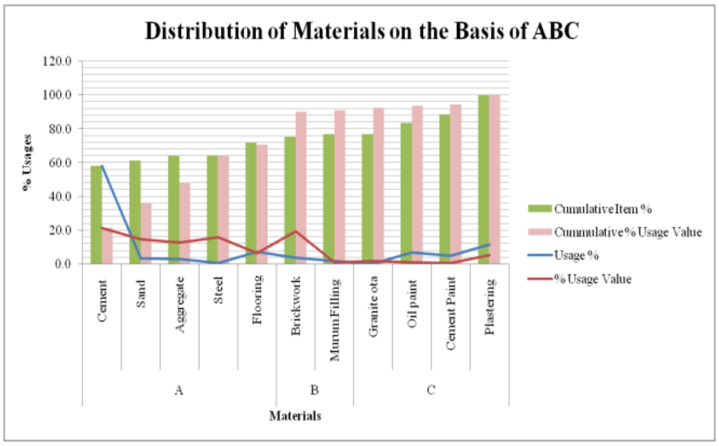

Fig - 3. Distribution Of Materials On The Basis Of ABC Building P

From above the results it is observed that distribution of materials of ABC analysis in building P. Here annual used material is divided in A, B, C caterigories. Results observed maximum 70.65%, 20.32%, 9.03% material are covered under category 'A', 'B', 'C' respectively.

Table 3: Calculation For Distribution Of Materials On The Basis Of ABC Building R

SrNo	Item Description	Unit of material	Annual Usage	Usage %	Cumulative Item %	Rate /Unit	Value	% Usage Value	Cumulative % Usage Value	Material Type
1	Cement	Bags	2546.7	46.8	46.8	380	967732.234	18.50	18.50	A
2	Sand	cum	132.6	2.4	49.2	5000	663193.691	12.68	31.19	
3	Aggregate	cum	177.4	3.3	52.5	4500	798211.407	15.26	46.45	
4	Steel	ton	7.9	0.1	52.6	45500	359450	6.87	53.32	
5	Flooring	cum	404.482	7.4	60.1	951.8	384985.968	7.36	60.68	
6	Brickwork	cum	193.457	3.6	63.6	5500	1064013.5	20.35	81.03	B
7	Murum Filling	cum	38.45	0.7	64.3	550	21147.5	0.40	81.43	
8	Granite Ota	nos	3	0.1	64.4	37000	111000	2.12	83.56	C
9	Oil Paint	Sqm	190	3.5	67.9	190	36100	0.69	84.25	
10	Cement Paint	Sqm	140	2.6	70.4	140	19600	0.37	84.62	
11	Plastering	sqm	1608.657	29.6	100.0	500	804328.5	15.38	100.00	
	Total		5442.6				5229762.8			

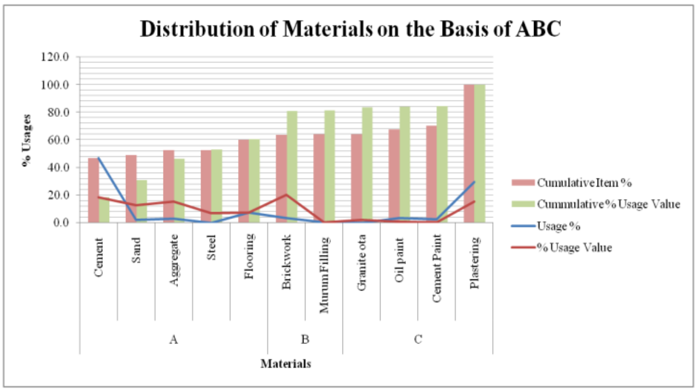

Fig - 4. Distribution Of Materials On The Basis Of ABC Building R

Fig - 5.

From above the results it is observed that distribution of materials of ABC analysis in building R. Here annual used material is divided in A, B, C caterigories. Results observed maximum 60.68%, 20.75%, 18.57% material are covered under category 'A', 'B', 'C' respectively.

4.2 EOQ analysis for a Building

Table 4: Calculation For EOQ Analysis for Building

Sr. No	item	Unit	Annual Demant (Units)	Cost per Order	No of order	Quantity Per Order	Annual Carrying Cost per unit	EOQ	No of Order for Cement bags
			D	S			H		
Case 1	Cement	Bags	1343.5	127632.5	4	335.875	10636.04	180	7
Case 2	Cement	Bags	2464.124	156061.2	6	410.6873	13005.1	243	10
Case 3	Cement	Bags	2546.664	138247.5	7	363.8091	11520.62	247	10

From the data collection of the construction site case 1, gives the 4 cement Bags per order for construction. Due to this order carrying cost & inventory cost are increases. But when we applied EOQ analysis on cement bags. Then we got the optimal quantity of cement bags. After EOQ Analysis we got Optimal Order Quantity of cement bags are 8 units. At this order we minimize the ordering and carrying costs. Annual demand of Cement bags are 1343.5 units so the construction site to place 7 orders)

No of order for cement bags = D/EOQ =1343.5/180 = 7

No of order for cement bags = 7

No of frequency for cement bags = $\frac{1}{7}x425$

= 61 days

4.3 Preliminary Proposal for Measuring Performance

In order to carry forward this study has selected processes and project results used in models developed. They are listed in Table, with proposed measures of performance which can be used for these variables. Currently, an effort is being carried out with a group of companies to implement a performance measurement system which includes this set of measuring parameters.

Table 5: Proposed Project Performance Parameters

Result	Parameters	Units
Cost	Cost variation	Actual cost/Budgeted cost
Scheduled duration	Schedule variation	Actual duration/Planned duration
Quality	Schedule variation	% Sample rejections
Scope of work	Change in scope of work	Change orders/Budgeted cost
Process	**Parameters**	**Units**
Procurement	Delivery time	Delivery cycle time
	Compliance w/specs	% compliance w/specs Labor (MH) Actual labor MH vs Planned
Construction	Labor (MH)	Actual labor MH vs Planned MH
	productivity	Actual vs Planned
	Rework	Rework MH/Total MH
	Material waste	% Material waste
	Equipment	% stand by hours
	Activities at planned rate	% activities working at planned rate
Planning	Planning effectiveness	% Planned Activities Completed
Engineering Design	Design changes	Number of changes/ Total number of drawings
	Errors /Omissions	Number of errors/ Total number of drawings
Other Variable	Parameters	Units
OH & S	Accident frequency	Number of accidents*100/ Total number of workers
	Risk rate	Number of days lost*100/ Annual Average of workers
Subcontracts	Subcontracted MH	% MH subcontracted
	Subcontracted $	% of cost subcontracted

4.4 Summary

Following result are concluded in 3 residential building case study

Table 6: Summary of ABC Results

Description	Total Cost Of Building	Applications Of ABC Analyzed Total Cost	Reduced Cost In %
Case 1	2893011	2619934	9.44
Case 2	4612649	4421386.3	4.15
Case 3	2786576	5229762.8	46.72

5. CONCLUSIONS

The principal aspects of this research can be summarized in the following specific points:

- To propose and support the implementation of project performance measurement systems in construction companies, with the dual purpose of supporting continuous improvement for company operations and to gather empirical evidence in a standard form.
- To generate a database with empirical information on projects, which will be useful to develop third party benchmarking which contributes to the improvement of the industry as a whole. With respect to the limitations of benchmarking of results, it is proposed that benchmarking parameters include the measurement of processes and other intermediate factors present in projects.
- To develop models that combine empirical information with expert knowledge. These models will be used to develop first principles of project performance in the areas of interest.
- The practical use of this information would inform to industry about the causality of results and would allow a better understanding of the reasons that lead to a better or worse performance.
- As per analysis it can be conclude that the inventory control very useful the cost of a any construction project.
- The implementation of ABC analysis gives the distribution of A, B, C type material. This distribution of material gives the economical importance of the material.
- 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.
- From analysis it can be conclude that if there is saving of materials by implementing ABCS analysis and EOQ methods to project then this will give huge money savings in large projects.
- Inventory control system minimizes the wastage of materials which ultimately saves the cost of a project.

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