Material Management of High Rise Construction Project

[1]Pritesh B. Shrimali, [2]Dr. Jayeshkumar Pitroda, [3]Prof. Chitanjan Patel
[1] Student of M.Tech. Construction Engineering and Management, Birla Vishwakarma Mahavidyalaya, Engineering College, Vallabh Vidyanagar, Anand, Gujarat.
[2]Associate Professor, P.G.Co-ordinator, Construction Engineering and Management, Civil Engineering Department, Birla Vishwakarma Mahavidyalaya, Engineering College, Vallabh Vidyanagar, Anand, Gujarat.
[3] Assistant Professor, Civil Engineering Department, SVIT Engineering College, Vasad, Gujarat.

Abstract: The goal of material management is to ensure that the materials are available at their point of use when needed. Hence, well-organized procurement of material represents a key role in the successful conclusion of the work. If the materials are not managed properly then it affects the cost of the construction and also the time and effort invested on the construction site is wasted. There are many problems to affect the civil construction project. Like, cost, time, quality, safety, materials etc. This paper shows awareness and considerate of the different factors affecting construction material management is required to reduce project cost overrun and site completion delay. Material management is concerned with the planning, identification, procuring, storage, receiving and distribution of material. For this study, data was collected using both primary and secondary sources. The primary data was obtained through observation and interview of the contractor and site engineer directed to contractors that are involved in building projects. The secondary data was obtained from previously done different researches, internet, journals and books. The secondary data was used as a source for problem identification and was used as criteria for developing and analyzing the primary data. From the material management processes decrease the cost of material and also time saving of high rise construction projects. Materials inventory control like ABC Analysis, FSN Analysis, Bar chart, Job layout are discuss out the different site.

Keywords: ABC Analysis Construction, Bar chart, Job layout Project, High Rise Construction, Material Management, Reduce Cost, Reduce Time

I. INTRODUCTION

In this age of modernization the building industry is developing very fast with this development there is huge amount of money spent on this industry. Material management is defined as planning, identification, procuring, storage, receiving, and distribution of the material. The main purpose of material management is to assure that the right materials are in the right place, in the right time, in the right quantity when needed. The cost of materials is about 65% of the total cost of any building. The responsibility of material management department for the flow of materials from the time the materials are ordered received and stored until they are used in the basis of material management. If the materials are not managed properly then it affects the cost of the building and also the time and effort invested on the construction site is wasted. The money and time wasted due to poor materials management can be saved and can be used for betterment of the project. There is also a significant amount of materials wastage as materials if not managed on the site in a proper manner. This wastage of materials, wastage of time, and wastage of money all creates a loss of money and energy. Also the inventory control like ABC Analysis, FSN Analysis, Bar chart, Job layout are discuss in this paper. From the analysis of inventory control there are some suggestions and also the recommendation of the analysis gives from the case study. As we know the 65% of the total cost of any building is spend on materials and its handling. So if the materials are managed properly there can be a significant difference in the profit or loss from the construction projects. To understand the practical aspect of the materials management and its effects on the real time construction site, I have working on a case study.

II. AIM

The main aim of my research is to study scientific process of materials management and compare it with the process actually followed at the construction site. In order to have clear understanding of subject matter I have decided to undertake a case study of a building project.

III. OBJECTIVE

Objective of study is given below,

1. To find the critical factor affecting to the material management of high rise construction project.
2. To reduce the cost of high rise construction from proper inventory control like ABC Analysis.
3. To reduce the time of high rise construction project from the bar chart and job layout of construction site.

IV. LITERATURE REVIEW

There are lots of literatures of material management on internet. From the literature finds the critical factor of material management of construction project.

1. Major factor affecting material management are poor inventory control, poor construction methods, use of technology, delay in material delivery etc.
2. For large companies, material management factor is highly affecting construction site. While in small and medium companies owner/consultant factor need special attention for material management.
3. Most of companies are follows material management process as per the traditional ways.
4. The scope of study is mainly focus on the large construction project.
5. Most of the researchers have used inventory control method like, ABC analysis and EOQ analysis.

V. CASE STUDY

For the understanding and find the critical factor of high rise construction project, there are conducted the case studies. Following table I is the different case study and their details.

TABLE I
CASE STUDY DETAILS

Sr. No.	***Site Name***	***Developer***	***Present Situation***	***Location***
1	Abhyuday Heights	Abhyuday Enterprise	2 Tower, G+7	Opp. Abhyuday Arcade, Dahej Bypass Road, Bharuch
2	R.K. County (Rang Krishna's County)	Shree Saikrupa Creation	7 Tower, G+7	Opp. Narmada Collage, Bharuch
3	Rang Skycity	Sai Ashish Developers	2 Tower, G+2	Sukaltirth Road, Tavra, Bharuch

A. MATERIALS COST DETAILS

Following table II is cost of each material. These costs of each material are come from the regular site visit and also the site engineer of construction site.

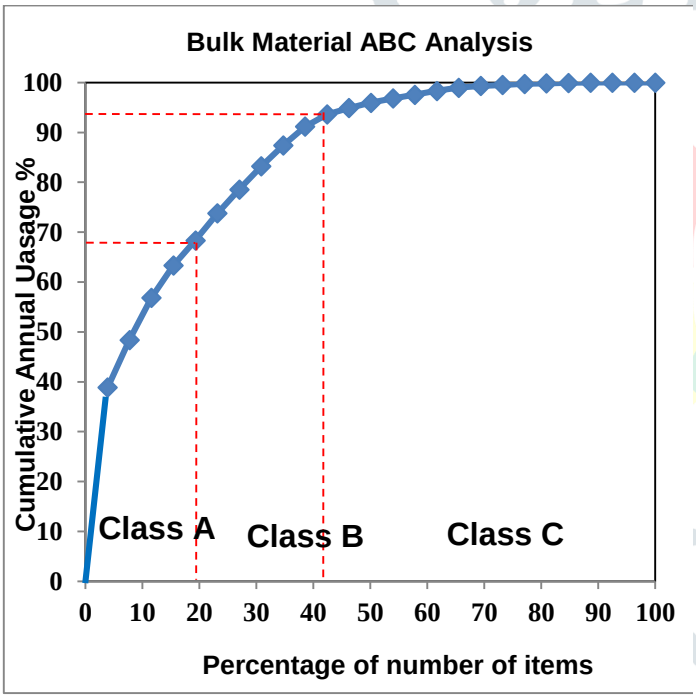
TABLE II
DIFFERENT MATERIALS

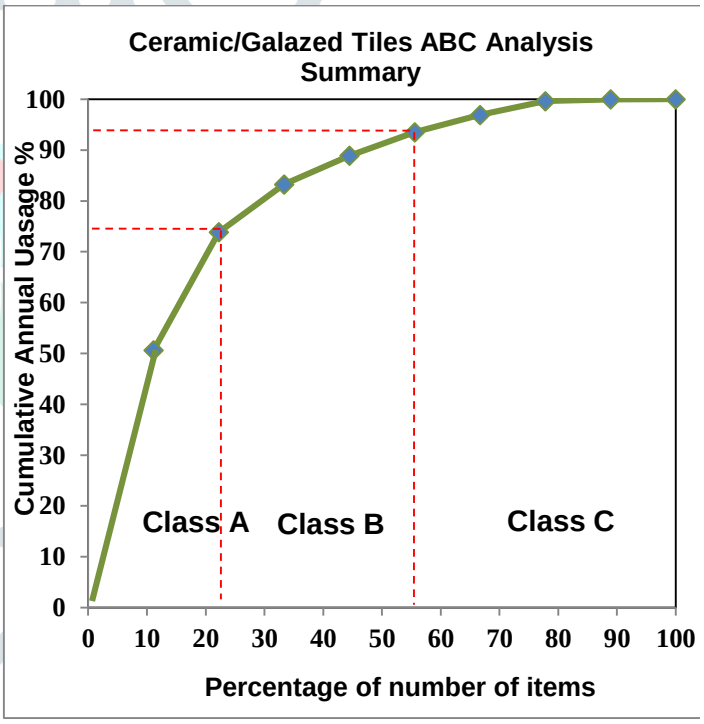
Bulk Material	**Ceramic/Glazed Tiles**	**Doors/Window**
1. Cement 2. Sand 3. Steel 4. Aggregate 5. Admixture 6. Weld mesh 7. Binding Wire 8. Hardwood 9. Metal 10. Fly Ash 11. Softwood	1. Black Granite 2. Kota Stone 3. Ceramic Tiles (Glazed) 4. Vitrified Tiles 5. Granite (Gray)	1. Main Door 2. Bed Room Door 3. Toilet Door 4. Kitchen Yard 5. Terrace Door 6. LMR Door 7. Data Rm, Garbage Rm, Meter Rm 8. Lift Door 9. LV Duct 10. Garbage Chute 11. Fire Duct 12. Living Room Window 13. Master Bedroom Small Window 14. Kitchen Window 15. Dining Room Window 16. Toilet Window
Plumbing/Sanitary Fitting	**Kitchen cabinets**	**Wiring/Electric Legend**

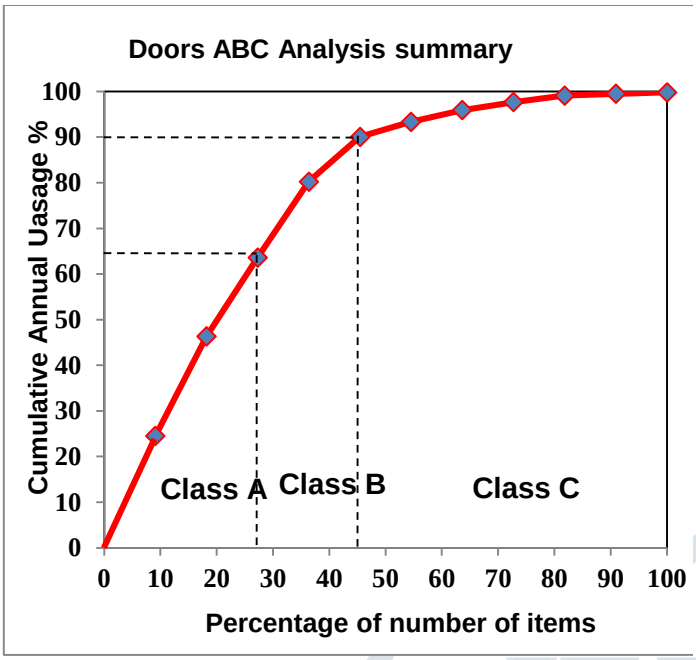
1. Wash basin 2. Long Body Big Cock 3. Wall Mixture 4. Shower 5. Water Closet 6. Health For Faucet 7. Angle Cock 8. Waste Pipe 9. Consenting Pipe 10. Sink Coupling 11. Flow Tap 12. Flange	1. Kitchen Sink 2. Sink Cock 3. Sink Waste Coupling 4. Short Body Big Cock	1. Door Bell Point 2. Light Point 3. Fan Point+ Regulator 4. AC ON/OFF Switch 5. 5AMP Switch & Socket 6. Telephone Point 7. T.V Cable Point 8. 15 AMP Socket Looped

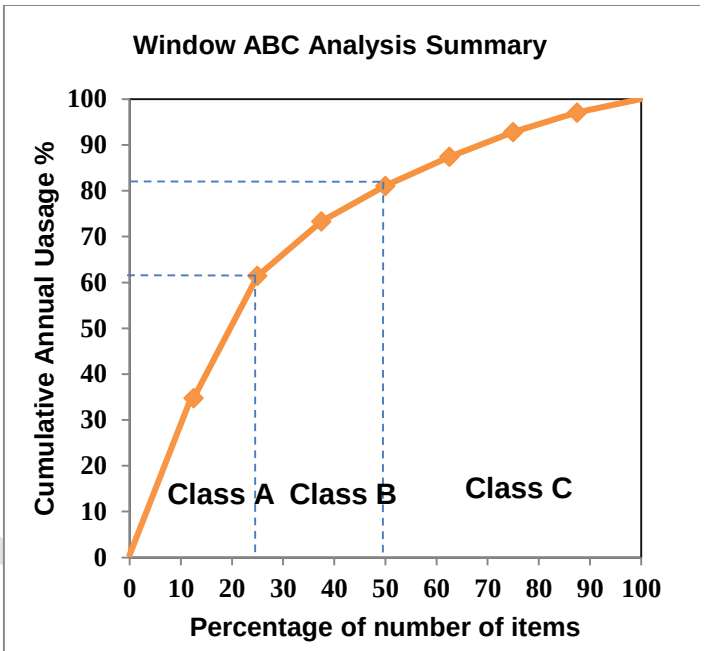
B. ABC ANALYSIS

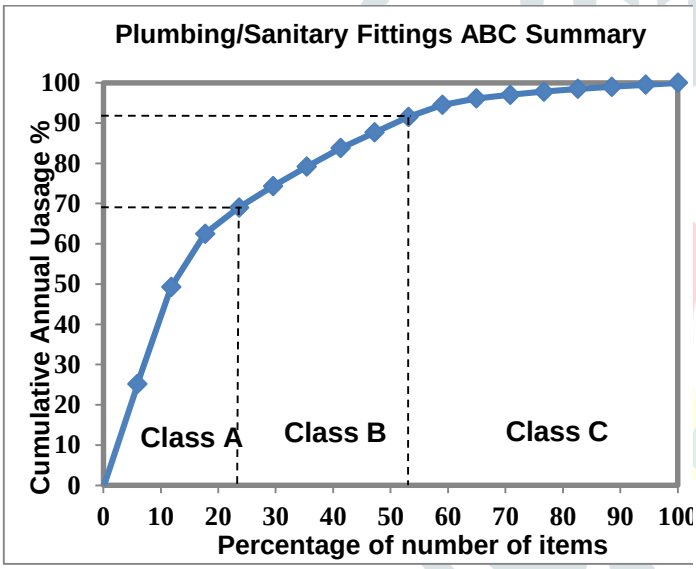
ABC Analysis s a basic analytical management tool, which enables top management to place the efforts where the results will be greatest. This technique popularly known as Always Better Control, has universal applications in many areas of human endeavor. In ABC Analysis, 'A' class items account for about 70% of the usage value, 'B' class items for about 20% of the usage value and 'C' class items constitute about 70% of the usage value. In terms of number 'A' class items constitute about 10% of the total items, 'B' class items constitute about 20% of total items and 'C' class items constitute about 70% of total items. In material management, this technique is being applied in areas need in selective control, such as inventory, criticality of items, obsolete stocks, purchasing orders ,receipt of materials ,inspection ,store-keeping, verification of bills.

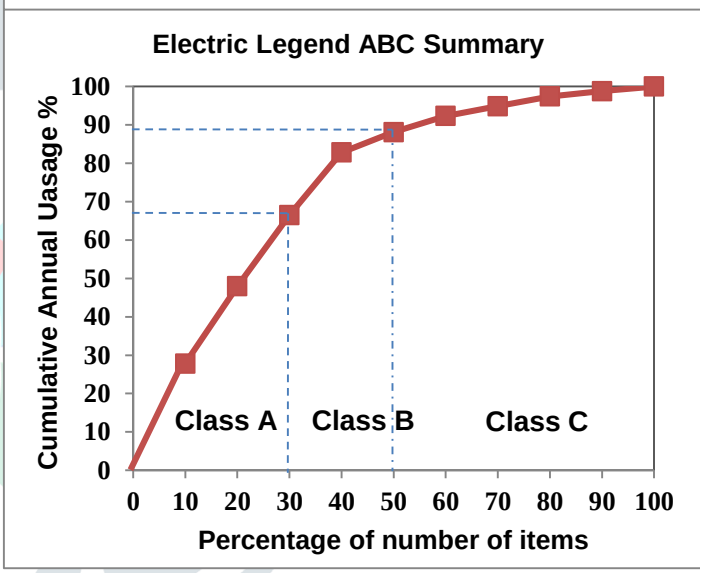












C. BAR CHART

The following figure II is the snapshot of bar chart created in excel to understand and compare the actual work on the site with planned. The actual work on site was observed by doing regular site visit. It helps to understand the difference between planned and actual work and also problems due to which work is delayed.

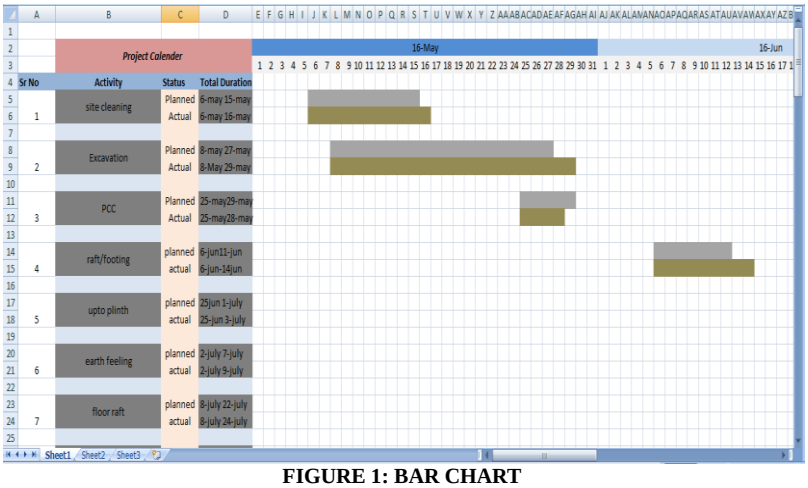


FIGURE 1: BAR CHART

D. JOB LAYOUT

Storage of materials on the site can be seen from figure given below; this is the actual layout of the construction site. Materials are placed at the different places so that the inconvenient to utilization of materials. Therefore the management of materials is not properly done. Figure 3 is the actual job layout of construction site. Which is shows that the some of material are not properly placed at the site.

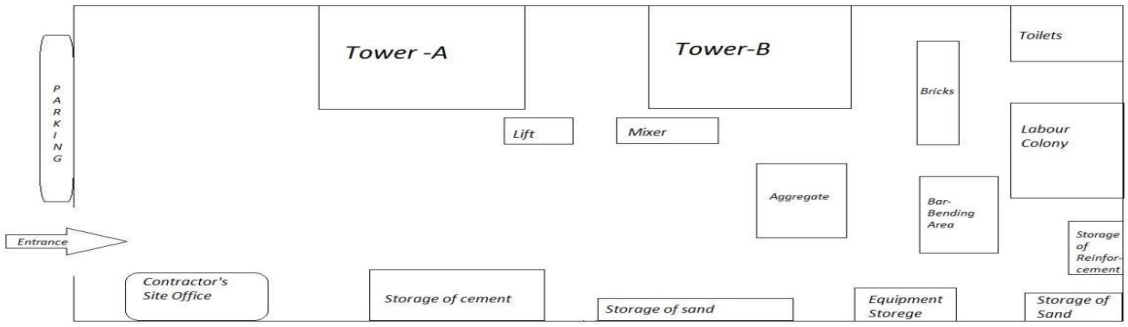


FIGURE 2: ACTUAL JOB LAYOUT

Figure 4 is the planned layout of the construction site. The planned job layout is based as per engineer book. Materials are placed at the convenient places so that utilization of materials is good. So that the management of material are efficient.

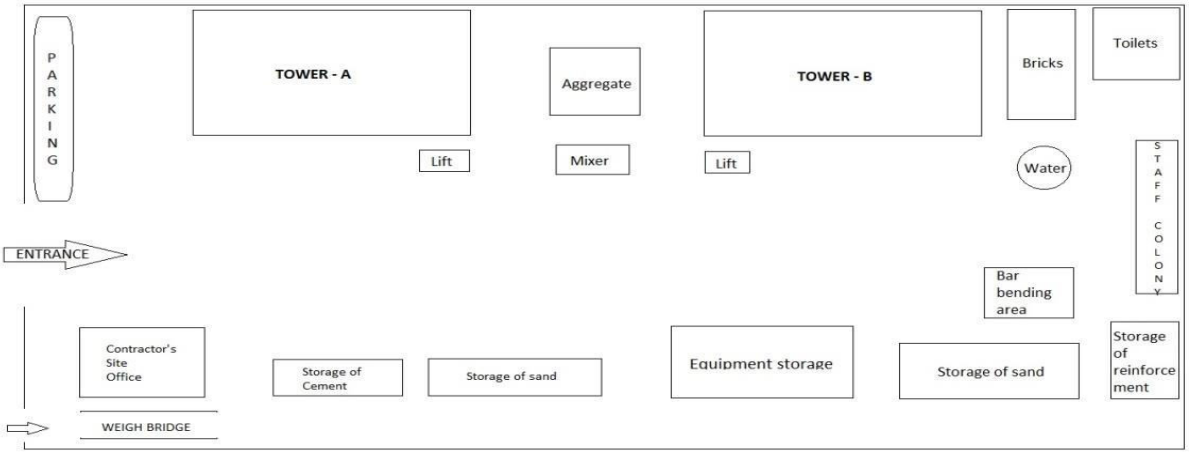


FIGURE 3: PLANNED JOB LAYOUT

From the job layout of the site I can see there is a mismanagement in placing of some materials which creates a haphazard situation on site on a busy day. Also the approach for the material handling equipment is from the centre of the site which is not suggested for such site.

III. CONCLUSION

ABC analysis performed on bulk material, ceramic Glazed tiles, doors, Windows, plumbing/ sanitary Fittings, kitchen cabinets, wiring/ Electric Legend by the data analysis the those 70-80% of the total yearly usage value that class 'A' category items rigid Control and need to be stocked in smaller quantities. Class 'B' category those 15-25% of total yearly usage value items formalized inventory system, also less purchase and store management. Class 'C' category those 10-15% of total yearly usage value items should be procured rarely and enough quantities.

The actual work on site was observe by doing regular site visit. It helps to understand the difference between planned and actual work and also problems due to which work is delayed. From bar chart actual work on the site site mostly delay, so the time of project are increase. When time of project are increase indirectly increase in cost. With increasing time of project the penalty of the delay are increase. Also delay for the customers of the residential project.

The actual work on site was observe by doing regular site visit. From the site visit lost of materials are place anywhere. There no job layout for the site. On site, where the place shows materials are lay down on ground surface. Also the approach for the material handling equipment is from the centre of the site which is not suggested for such site.

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AUTHOR'S BIOGRAPHY

Pritesh Shrimali, born in gujarat, india pritesh completed his graduation in civil engineering from Shree sad Vidhya Mandal Institute of Technology – bharuch in 2017. Currently he is student of birla vishawakarma mahavidhyalaya pursuing m. tech in construction engineering and management. He is working on material management on high rise construction project.

Dr. Jayeshkumar Pitroda, received his Bachelor of Engineering Degree in Civil Engineering from Birla Vishwakarma Mahavidyalaya Engineering College, Sardar Patel University (Vallabh Vidyanagar, Gujarat-India) in 2000. In 2009 he received his master‟s degree in Construction Engineering and Management form Birla Vishwakarma Mahavidyalaya Sardar Patel University (Vallabh Vidyanagar, Gujarat-India). In 2015 he received his Doctor of Philosophy (Ph.D.) Degree in Civil Engineering from Sardar Patel University (Vallabh Vidyanagar, Gujarat-India). He has joined Birla Vishwakarma Mahavidyalaya Engineering College as a faculty in 2009, where he is lecturer of Civil Engineering Department and at present working as Associate Professor from February 2018 having total experience of 18 years in the field of Research, Designing and Education. At present holding charge of PG Coordinator Construction Engineering and Management. He is guiding M.E. / M. Tech (Construction Engineering and Management/ Construction Project Management/ Environmental Engineering) thesis work in the field of Civil / Construction Engineering/ Environmental Engineering. He is also guiding Ph.D. students (Civil Engineering). He has published many papers in National / International Conferences and Journals. He has published nine Research Books in the field of Civil Engineering, Rural Road Construction, National Highways Construction, Utilization of Industrial Waste, Fly Ash Bricks, Construction Engineering and Management, Eco-friendly Construction.

Prof. C.G.Patel , received his bachelor of Engineering Degree in Civil Engineering from Birla Vishwakarma Mahavidyalaya Engineering College, Sardar Patel University (Vallabh Vidyanagar, Gujarat-India) in 1995. In 2002, he received his master's degree in Construction Engineering and Management form Birla Vishwakarma Mahavidyalaya Sardar Patel University (Vallabh Vidyanagar, Gujarat-India). He is lecturer of Civil Engineering Department , SVIT Vasad and at present working as Assistant Professor ,having total experience of 23 years in the field of Research, Designing and Education.He published several research paper during this time. He is guiding M.E. / M. Tech (Construction Engineering and Management/ Construction Project Management) thesis work in the field of Civil / Construction Engineering.