

# Use of Various Techniques of Material Management for Construction of Industrial Building

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**ABSTRACT:** The average material cost is 55-60 % of total project cost. Hence, efforts should be taken to reduce material cost. In actual practice most effort are done to reduce labour cost. Furthermore effective material management can be instrumental in cost reduction to further extent. The cost, quality & time are important objective of material management.

There are various functions of material management .These are identification with estimation of material requirement, procurement, inventory control, storage, disposal of surplus material & scrap. If material is purchased too early, capital gets tied up as well as, interest charges incurred on excess inventory of material. On other hand if material availability at site is delayed it will affect scheduling of activities. Advance material procurement or delayed both can affect cost, quality & time. So it is very important to get material at right cost, at right quality & right time. This can be achieved by using material management techniques.

The ABC analysis, VED analysis & SDE analysis are different techniques of material management. These techniques can lead to effective material management in construction projects. ABC analysis is based on inventory value of material.VED analysis gives Priority to utility of material whereas SDE analysis gives availability of material in market.

**KEYWORDS:** Material Management, Procurement, Inventory, ABC, VED, SDE.

## I. INTRODUCTION

The cost, time & quality are the important objective of material management. Cost is an important parameter of any project. The material availability at right cost is key for economy of project. If material is purchased too early, capital gets tied up as well as ,interest charges incurred on excess inventory of material .On other hand if material availability at site is delayed it will affect scheduling of activities.

Time is important parameter of any project. Material should be available in hand at right time for successful completion of project. Men & machinery become ideal if material is not available on time further it increases the time of completion of project. Quality is an important factor for any project. Quality of construction can be achieved by procuring standard.

The objectives of project are as follows

- ▶ To determine effective material cost from total project
- ▶ To find out causes of lacune in material management
- ▶ Find out the benefits of material management & various techniques if would have used in Indus Construction Company.
- ▶ To study inventory control techniques.

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## II .RELATED WORK

The various researches were done on material management. Ashwini R.patil et al. [3] described material management techniques. This paper represents comparison of planned versus actual material consumption done by using MSP software. The techniques such as ABC analysis, EOQ analysis and S curve analysis are used. Anup Wilfred et al.[2] studied assessed the material management principles and practise in a residential project. A. A .Gulghane et al. [1] did systematic investigation of management of construction materials, material management techniques, control of construction waste, existing situation of construction management and construction waste in the industry. Hemishkumar et al. [6] studied material management and inventory management. S. Sabihuddin et al. [15] described material management process and techniques of material management such as ABC, S curve and EOQ analysis are used.

## III. METHODOLOGY

The research methodology approach for this study contains various stages. In first stage need of material management, for that literature review is carried out. In literature review ABC analysis, S curve analyses are mostly used for material management. ABC analysis is most important. The preparation of a questionnaire is based on causes of poor material management & techniques used for material management. Further to analysis the various methods & finally discussion on result obtained.

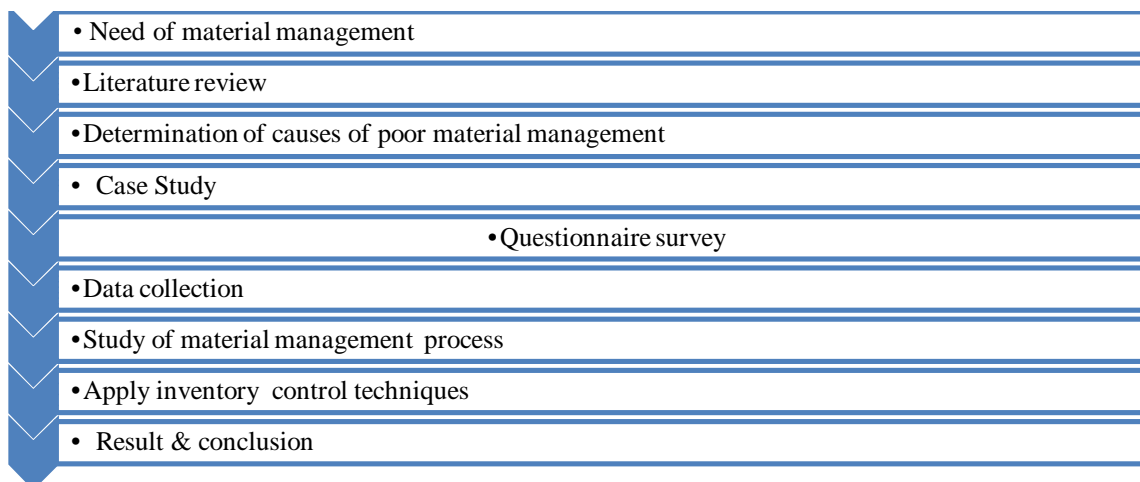


Figure No.1 Flow diagram of methodology

## IV. EXPERIMENTAL RESULTS

### A. CASE STUDY DETAIL

- ▶ Project Name –Construction of Pilot Plant.
- ▶ Client Name- Piramal Enterprises Ltd. Digwal Zaherabad
- ▶ Consultant Name-Shroff & Associates ( Engineers ) Pvt .Ltd
- ▶ Contractor Name-Indus Construction Company
- ▶ Project Starting Date -5 July 2015
- ▶ Project Duration-4 Months
- ▶ Project Type- Commercial building
- ▶ Project Location- Digwal Zaherabad near Hyderabad.

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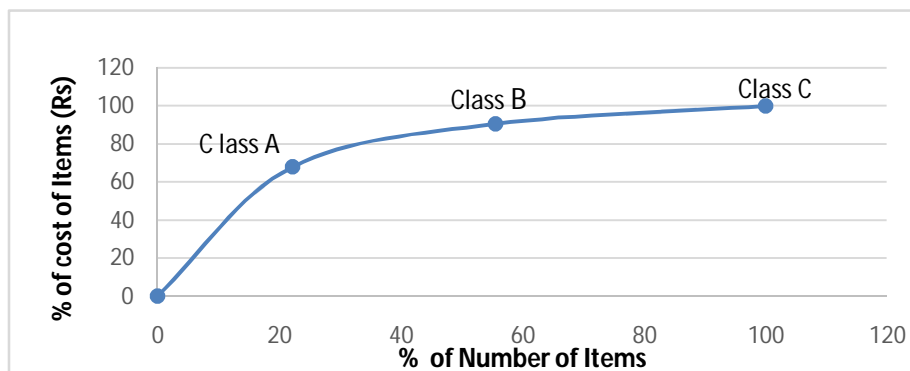
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The table no 1 shows material used and its quantity, cost. The total cost of project is Rs 41,43, 540. This material cost detail is very important concern for application of ABC analysis. The cost of steel and sand is highest among all material.

**Table No.1 Material cost detail**

Sr No	Material	Cost	Unit	Quantity
1	Sand	20,07,500	Brass	365
2	Steel	8,08,500	Kg	21,000
3	Metal	3,60,000	Brass	150
4	Cement	3,27,500	Bag	1,100
5	Concrete	2,47,440	Cum	51.55
6	Bricks	2,31,550	Nos	42,100
7	Rubble	1,29,200	Brass	68
8	Chemical	28,000	Pockets	8
9	Nails	3,850	Kg	70
	Total	41,43,540		

### **B. A.B.C ANALYSIS**



**Figure No. 2 ABC analysis**

This is graph of ABC analysis. It shows that A.B.C analysis gives following conclusions

Class A material -2 items (Cost 67.96% of total Project cost)

Class B material -3 items (cost 22.54% of total project cost)

Class C material -4 items (Cost 3.91% of total project cost).

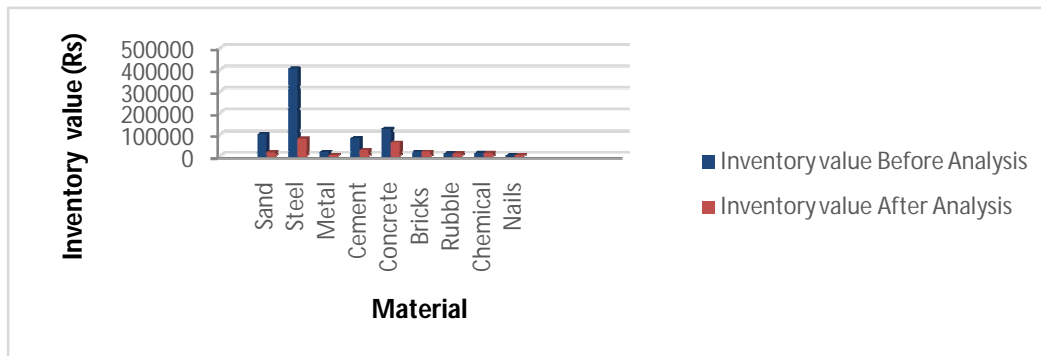
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Steel and sand are class A material. Metal, cement and concrete are class B material. Bricks Rubble, Hilti chemical, Nails are class C material.



**Figure No.3 Comparison of inventory value**

The inventory value of class A material such as steel, sand should be as less as possible. This shows the no of orders Class A material should increase. The inventory value of class B material such as Metal cement and concrete should in between Class A & Class C material. The inventory value of class C material should be maximum as possible (i.e no of orders should be less as possible).

### C. VED ANALYSIS

VED analysis gives importance of material. In VED analysis V stands for vital, E stands for essential and D stands for desirable items.

**Table No.2 VED analysis**

Sr. No.	Activity	Importance of material
1	Mobilization	I <sub>D</sub>
2	Footing excavation	I <sub>D</sub>
3	RCC	I <sub>V</sub> , I <sub>D</sub>
4	Plinth beam	I <sub>V</sub> , I <sub>D</sub>
5	First floor slab	I <sub>V</sub> , I <sub>E</sub> , I <sub>D</sub>
6	Second floor slab	I <sub>V</sub> , I <sub>D</sub>
7	Ground floor grade slab	I <sub>V</sub> , I <sub>D</sub>
8	Ground floor brickwork	I <sub>V</sub> , I <sub>E</sub> , I <sub>D</sub>
9	First floor brickwork	I <sub>V</sub> , I <sub>D</sub>
10	Terrace floor brickwork	I <sub>V</sub> , I <sub>E</sub> , I <sub>D</sub>
11	Internal plaster	I <sub>V</sub> , I <sub>E</sub> , I <sub>D</sub>
12	External plaster	I <sub>V</sub> , I <sub>E</sub> , I <sub>D</sub>
13	Plot development	I <sub>D</sub>
14	Handling over	I <sub>D</sub>

**Nomenclature – I<sub>v</sub> – Importance factor vital, I<sub>E</sub>-Importance factor essential, I<sub>D</sub>-Importance factor desirable**

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## D. SDE ANALYSIS

Table No.3 SDE analysis

Season/Availability	Scarce	Difficult	Easily available item
Summer season	-	Metal, cement, brick, sand	Plumbing material, tiles, painting material, railing ,rubble
Winter season	-	-	Metal, cement, steel, brick, sand, tiles, plumbing material rubble, waterproofing material, railing
Monsoon season	Sand	Metal, steel, sand, brick	Plumbing material, tiles, putty, soil, painting material nails, rubble

## 5. Investment by using different techniques

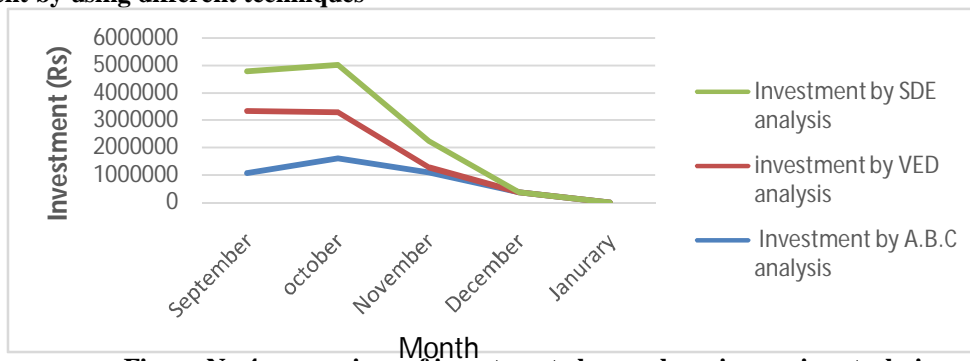


Figure No.4 comparison of investment charges by using various technique

This shows that investment is uniform throughout project by using ABC analysis. This shows ABC analysis is most economical throughout project. In case of SDE and VED analysis the initial investment is more so interest charge will be more.

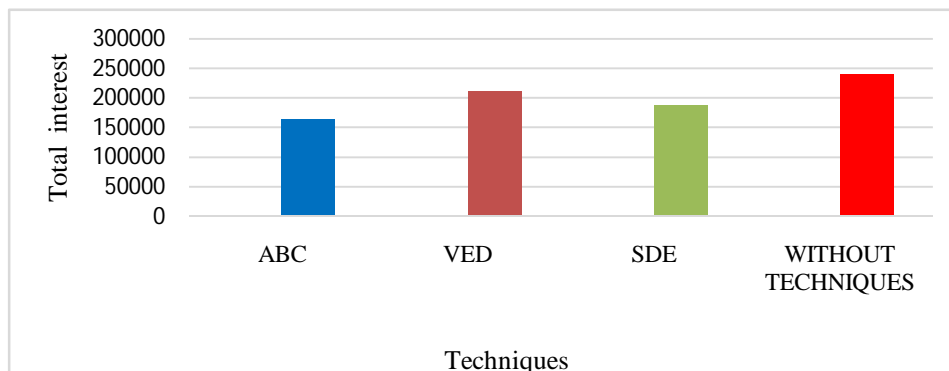


Figure No. 5 Comparison of various techniques

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This variation of chart shows that ABC analysis is most economical. The ABC analysis gives interest cost about Rs 1,64,723 ,VED analysis gives interest cost about Rs 2,11,835.84 ,SDE analysis gives interest cost about Rs 1,88,575.33.If no techniques is used the interest cost will be Rs 2, 41, 706.5.

## V. CONCLUSION

- 1) The A.B.C analysis only gives idea about inventory value .A.B.C analysis does not give the importance of material (i. e critical nature of items).After A.B.C analysis application the inventory value reduce from Rs 7,74,207.49 to Rs 2,38,243.325.
- 2) VED analysis gives importance of material for each activity. SDE analysis gives availability of material in market depending upon season.
- 3) A.B.C analysis gives less interest charges as compare to other techniques. It shows that A.B.C analysis is most economical than other method.
- 4) following points should be consider while ordering material i) The scheduling of activities. ii) Quantity of material required. iii) Transportation capacity & time required to reach the site. iv) Supplier previous records, location.

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