Inventory Management in Construction Projects

[1] Rakshna A, [2]Jegan G.S
[1]Student, Department of civil engineering, Thiagarajar College of engineering, Madurai
[2] Assistant Professor, Department of Civil Engineering, Thiagarajar College of engineering, Madurai

Abstract: - **Inventory management is the process of overseeing and controlling the flow of materials in construction site .It hold the major cost in construction. This project is about the controlling cost associating with the inventory. Among the various cost involved in inventory here holding cost of the inventory is discussed. The fraction of holding charge is 25 per cent per year. Cost of insurances, storage cost, cost due to obsolescence, pilferage, deterioration, Cost of Damage, Cost of Financing, Taxes on inventory etc are identified as the reasons of holding cost of the inventory. FSN Analysis and ABC Classification are carried out to find the material causing high inventory cost in construction industry. To optimize this holding cost proper material handling technique is recommended.**

Key words— Inventory, Holding cost, Material management, FSN Analysis, ABC Analysis.

I. INTRODUCTION

A 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.

1.1 STUDY AREA:
• Taken study area is a 2BHK Apartments located in sulur –Coimbatore district.
• Number of houses 20no's
• Number of story G+10no's
• Present status G+1

1.2 AIM:
1. The aim of this study is to acquire knowledge about various types of Inventory Technique
2. To determine the appropriate inventory control for the reduction of inventory related cost

1.3 OBJECTIVE:
1. To minimize the Holding cost associated with inventory.
2. To find suitable inventory handling technique for the effective management of materials in site
3. To highlight various inventory issue in industry.
4. To reduce the losses, damages, theft of material.

1.4 SCOPE:
1. To reduce the cost on the material by controlling the holding cost of the inventor
2. Scope of my project is limited to construction companies within the Coimbatore city

II. PROBLEM IDENTIFICATION

In order to reduce the holding cost of inventory following are the factors that influence the holding cost of the inventory they are listed below
❖ Cost of Storage and Handling cost
❖ Cost of obsolescence
❖ Cost of Damage
❖ Cost of Financing
❖ Taxes on inventory
❖ Insurance cost
❖ Warehouse Expense

Percentage accumulation of problem identified
❖ Cost of Storage and Handling cost 2-5%
❖ Cost of obsolescence 3-6%
❖ Cost of Damage 3-6%
❖ Cost of Financing 6-12%
❖ Taxes on inventory 2-6%
❖ Insurance cost 1-3%
❖ Warehouse Expenses 2-5%

III. METHODOLOGY
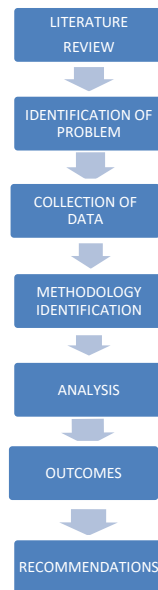
IV. ANALYSIS:

Following data's where collected in the apartment building located in sulur-Coimbatore district. It contain Materials, monthly consumption of materials and their rate at which the procured. Followings are listed in Table 4.

ITEM CODE	MATERIALS	Monthly utilization	Unit price
001	Cement	85 bags	Rs 400 / bag
002	Brick	4 loads i.e 3000no's/load	Rs 8/ no's
003	Sand	3 load	Rs 4500/ load
004	Steel Rod	2 000 Kg	Rs 53000/ Kg
005	Aggregate (1.6in,0.9in)	1 load	Rs 3000
006	Sal Wood	0.75 cu.m	Rs 1700 / cu.m
007	Tiles	139.35 sq.m	Rs 60
008	Paint	10 l	Rs 780/ l
009	Electrical wire	10 box	Rs 650 / box
010	Electrical pipes	¾" in – 30.48m	Rs 63/m
011	Plumbing pipes	30.48 m	Rs 50/m
012	Glass	30 sq.m	Rs 58 / sq.m
013	Membrane sheet	50m	Rs 1425/ m
014	Primer	15 l	Rs 1775/ l
015	Sealant	8 l	Rs 1250 / l
016	Bath fittings	16 no's	Rs 3500 / no,s

Table 4.1 Collection of data

FNS ANALYSIS:

Fast Moving – Items which are frequently issued from inventory which are more than once for a specific time periodSlow Moving – Items which are less frequently issued which might be once in a specific time periodNon-Moving – Items which are not issued from the inventory at all in a specific time period

ITEM CODE	MATERIALS	FSN ANALYSIS
001	Cement	F
002	Brick	F
003	Sand	F
004	Steel	F
005	Aggregate(1.6in,0.9in)	S
006	Wood	S
007	Tiles	S
008	Paint	S
009	Electrical wire	F
010	Electrical pipes	F
011	Plumbing pipes	F
012	Glass	S
013	Membrane sheet	N
014	Primer	N
015	Sealant	N
016	Bath fittings	N

Table 4.2 FNS Analysis

ABC CLASSIFICATION:

ABC classification is a ranking system for identifying and grouping items in terms of how useful they are for achieving business goals.The system requires grouping things into three categories:

A - extremely important

B - moderately important

C - relatively unimportant

ABC classification is closely associated with the 80/20 rule, a business metric that proposes 80% of the outcomes are determined by 20% of the inputs. The goal of ABC classification is to provide a way for a business to identify that valuable 20% so that segment can be controlled most closely. Once the A's, B's and C's have been identified, each category can be handled in a different way, with more

attention being devoted to category A, less to B, and even less to C. ABC Classification are shown in Table 4.3.

ITEM CODE	ITEM NAME	MONTHLY VALUE (Rs)	% consumption value	Cumulative % monthly conception value
002	Brick	96000	22.35	22.35
007	Tiles	90000	20.95	43.3
016	Bath fittings	56000	13.03	56.33
005	Aggregate	53000	12.34	68.36
001	Cement	34000	7.91	76.27
006	Wood	33000	7.68	83.95
014	Primer	26625	6.19	90.14
003	Sand	13500	3.14	93.28
008	Paint	7800	1.81	95.09
009	Electrical wire	6500	1.51	96.60
004	Steel	6000	1.39	97.99
015	Sealants	2500	0.58	98.43
012	Glass	1740	0.40	98.83
013	Membrane sheet	1425	0.33	99.16
011	Plumbing Pipes	750	0.17	99.18
010	Electrical pipes	630	0.83	100

Table 4.3. ABC Classification
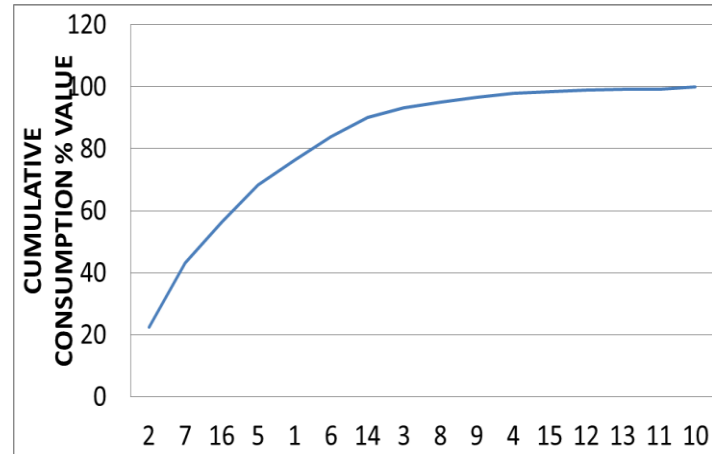
Figure 4.1 ABC classification graph

V. RESULTS

FNS ANALYSIS REPORT:

FAST MOVINGS – Cement, Brick, Sand, Steel, Electrical wire, Electrical pipe, plumbing pies SLOW MOVINGS – Aggregate, wood, Tiles, Paint, Glass.

NON MOVINGS – Membrane sheet, Sealant, Primer, Bath fittings.

ABC CLASSIFICATION REPORT:

A CLASS MATERIALS - Brick, Tiles, Bath fittings, Sand, Aggregate, wood, cement.

B CLASS MATERIALS - steel, primer, paint.

C CLASS MATERIALS- Electrical wire, sealant, glass, steel, plumbing pipe, membrane sheet electrical pipe

5.1. Discussion:

Excess temporary storage:
- ❖ Proper planning
- ❖ Estimation of safety material should not exceed 10%
- ❖ On site storage container usage
- ❖ It optimizes 3-6% the cost of Obsolescence

Excess handling of single pieces:
- ❖ Instead of handling single pieces , handling unit load is great
- ❖ Usage of packing strips and gunny bag
- ❖ It optimizes 3-12% cost of financing and 3-5% of labor cost s

Obstacles in material flow:
- ❖ Vendor analysis helps in delivery of right materials at right time and right place
- ❖ Quantity estimation should be done accurately
- ❖ It optimizes 6-12% cost of financing

Manual loading or unloading of goods:
- ❖ Fork lift can be used
- ❖ Semi skilled labors is enough to handle fork lift
- ❖ Conveyor belt can be used
- ❖ It optimizes 2-5% cost of handling materials and 3-5% of labor cost

Excessive time spent retrieving stored goods:
- ❖ Regular used goods and heavy materials has to be placed at the ground level itself
- ❖ Proper layout has to be planed for inventory
- ❖ Labors must have the knowledge about the placement
- ❖ It optimizes 2-5% the cost of warehousing

High damage rate:
- ❖ Labor has to be educated about handling the materials
- ❖ Contract document must contain a sentence that if the Damage rate goes beyond 10% , suppliers contract can be cancelled so the supply at good quality product
- ❖ It optimizes 3-6% the cost of Damage

Skilled, High paid employees waste too much time handling materials:
- ❖ If equipment are used semi skilled labors are enough to do the work
- ❖ Optimum pay has to be given instead of high pay
- ❖ This can optimizes 3-5% cost of the labors

Crowded operating condition:
- ❖ Materials has to be spread out and kept in site
- ❖ Flammable items has to be kept separately
- ❖ It optimizes the loss due to accidents

REFERANCE:

1.Construction Project Management 2015th edition by "kumar Neeraj Jha"

2.Miss. Monika Ramdas Nanaware, Prof. U. R. Saharkar (2017) - "Application of inventory control technique in construction"

3.International Journal of Engineering Research and General Science Volume 5, Issue 4, July-August, 2017 ISSN 2091-2730s

4.A K CHITALE, R C GUPTA, Materials management text and cases second edition , PHI Learning private limited.

5.Ahmad Zeb, Daudkhand, Muhammad sajd and Sikandar Bilal Khattak (2017) – "Inventory analysis of construction project"

6.Critical elements in implementations of just-in-time management: empirical study of cement industry 2015

7.Carlos H. Caldas et al, (2015) – "Materials Management Practices in the Construction Industry"

8.Kanyanat Jakkraphobyothin, Suparat Srifa, Thanwadee Chinda (2018) – " Factory analysis of Inventory Management"

9.Ahmad Zeb1, Daud Khan, Muhammad Sajid and Sikandar Bilal Khattak (2017) – "Inventory analysis of construction projects"