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HML Analysis for Inventory Management-Case Study of Steel Plant

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Abstract – An inventory management is most commonly used technique to manage inventory efficiently in an organization. The organization wants to control their inventory cost, so they used to different inventory techniques to control this. There are several techniques such as ABC, HML, VED and S-OS. In this study we shall focus on HML analysis. In HML analysis the items are classified into H, M and L classes based on unit cost. Data collection is mainly of 1 year through the general store manager and other staff involved in inventory control operation of steel plant.
Key Words:- ABC analysis, inventory management, inventory control.

I. INTRODUCTION

"Reference [1] shows, In any industry today inventory optimization is such a vital function. Excess and Shortage of inventory in all levels of the supply chain can affect the availability of products and/or services to consumers. Several monitoring systems and processes can be employed to check inventory imbalances to minimize the supply and demand dynamics. To simply these monitoring systems and process items/materials/products are classified into different groups".
"Reference [2] shows, Effective inventory Management has played an important role in the success of supply chain management. For organizations that maintain thousands of inventory items, it is unrealistic to provide equal consideration to each item. Managers are required to classify these items in order to appropriately control each inventory class according to its importance rating".
There are various types of inventory control analysis techniques such as ABC, HML, VED, S-OS etc. Here we shall focus on the HML analysis techniques

II. OBJECTIVE

A. General objective

To categories the inventory items into H, M & L class.

B. Main objectives

The main objective of this analysis is to minimize the inventory cost such as labor cost, material cost etc.

III. METHODOLOGY

There are various types of inventory control analysis techniques such as ABC, HML, VED and S-OS etc. Here we shall focus on the HML analysis techniques

A. HML analysis

The HML analysis is similar to ABC analysis the difference that instant "usage value, price" criteria is used. It is based on Pareto principle or the 80/20 rule.

In this analysis cut-off-lines are then fixed by the management of the organization to classify the inventory items. The cut-off-lines are based on unit cost such as

1) H-class item: - (10000-100000) Rs.
2) M-class item: - (1000-10000) Rs.
3) L-class item: - (0- 1000) Rs
4)

B. Percentage based classification on the H, M and L classes.

1) H-class item: These are the costly item and are generally 10-15% of total item.

2) M-class item: These items are low cost item as compared to H class items, this are generally 20-25% of total item.

3) L-class item: These items are low class item and generally 60-70% of total items.

TABLE 1
Shows particulars of HML analysis

Particulars	H-class item	M-class item	L-class item
Control	High	Intermediate	Low
Requirement	Low	Intermediate	High
Check	Tight	Intermediate	No
Safety stock	High	Low	Rare

C. Procedure

To conduct HML analysis, following steps are necessary:

1) Prepare the list of items and calculate their unit cost, annual demand and annual usage.

2) Arrange items in the decreasing order of their unit cost.

3) Calculate percentage of unit cost, cumulative of unit cost and then categories the inventory item.

4) The cut off lines are then fixed by the organization for deciding three categories.

5) Plot the graph on the basis of cumulative of unit cost and then categories the inventory items.

IV. CASE STUDY

Step1. Prepare the list of items and calculate their unit cost, annual demand and annual usage.

Step.2 Arrange items in the decreasing order of their unit cost.

TABLE2
Shows name of item, unit price, annual demand and annual usage of each item.

Item no.	Item	Unit cost (Rs)	Annual demand (Units)	Annual usage (Rs)
1.	TNT 8mm	31829.70	2.02MT	64296
2	M.S. round 25mm	31212.33	4.055MT	126566
3	Rolled diameter 110x520	11162.71	7 No.	78139
4	Rolled diameter 110x320	7229.14	7 No.	50604
5	Coupling F-100	5391	6 No.	32346
6.	Seating wall block (PP)	3375	6 No.	20250
7	Coupling F-80	3083.5	6 No.	18501
8	Oxygen regulator	2257	6 No.	13542

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9	Full argon gas cylinder	1301.4	15 No.	19521
10	Porous plug	900	15 No.	13500
11	A.C. sheet 3MPR	556.5	90 No.	50085
12	Slide gate plate 25mm	495	150 No.	74250
13	P.V.C. 5WR (pipe 110mm)	370	6 No.	2220
14	L.P.G. regulator	319	6 No.	1914
15	Full nitrogen cylinder	299.9	30 No.	8997
16	Tundish nozzle 13mm	225	450 No.	101250
17	Tundish nozzle 1305mm	225	450 No.	101250
18	Laddle nozzle 25mm	225	150 No.	33750
19	Collector nozzle 25mm	225	150 No.	33750
20	Female receptical with housing MK III	179.32	75 No.	13449
21	Full oxygen cylinder	118.625	120 No.	14235
22	Dummy bar bolt	110.2487	615 No.	67802.95
23	Cotton tape 1”	52.5	30 No.	1575
24	Tundish well block	28.125	600 No.	16875
25	Temp tips 600mm	27.36	100 No.	27360

Step3. Calculate percentage of unit cost, cumulative of unit cost and then categories the inventory item.
Step 4.The cut off lines are then fixed by the organization for deciding three categories.

TABLE 3
Show name of items, unit cost, %unit usage, Cumulative of unit & category for each item.

Item no.	Item	Unit cost (Rs)	% Unit cost	Cumulative of unit cost	Annual usage (Rs.)	Category
1.	TNT 8mm	31829.70	31.45	31.45	64296	H
2	M.S. round 25mm	31212.33	30.84	62.30	126566	H
3	Rolled diameter 110x520	11162.71	11.03	73.33	78139	H
4	Rolled diameter 110x320	7229.14	7.14	80.47	50604	M

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5	Coupling F-100	5391	5.33	85.80	32346	M
6.	Seating wall block (PP)	3375	3.34	89.14	20250	M
7	Coupling F-80	3083.5	3.05	92.19	18501	M
8	Oxygen regulator	2257	2.23	94.42	13542	M
9	Full argon gas cylinder	1301.4	1.28	95.70	19521	M
10	Porous plug	900	0.89	96.59	13500	L
11	A.C. sheet 3MPR	556.5	0.55	97.14	50085	L
12	Slide gate plate 25mm	495	0.49	97.63	74250	L
13	P.V.C. 5WR (pipe 110mm)	370	0.36	97.99	2220	L
14	L.P.G. regulator	319	0.31	98.30	1914	L
15	Full nitrogen cylinder	299.9	0.30	98.60	8997	L
16	Tundish nozzle 13mm	225	0.22	98.82	101250	L
17	Tundish nozzle 1305mm	225	0.22	99.04	101250	L
18	Laddle nozzle 25mm	225	0.22	99.26	33750	L
19	Collector nozzle 25mm	225	0.22	99.48	33750	L
20	Female receptical with housing MK III	179.32	0.18	99.66	13449	L
21	Full oxygen cylinder	118.625	0.12	99.78	14235	L
22	Dummy bar bolt	110.2487	0.11	99.89	67802.95	L
23	Cotton tape 1”	52.5	0.05	99.94	1575	L
24	Tundish well block	28.125	0.03	99.97	16875	L
25	Temp tips 600mm	27.36	0.03	100	27360	L

Step5. Plot the graph on the basis of cumulative of unit cost and then categories the inventory items.
X-axis shows = HML classification Y-axis shows = Cumulative percentage HML analysis on the basis of cumulative of unit cost is shown in fig.1

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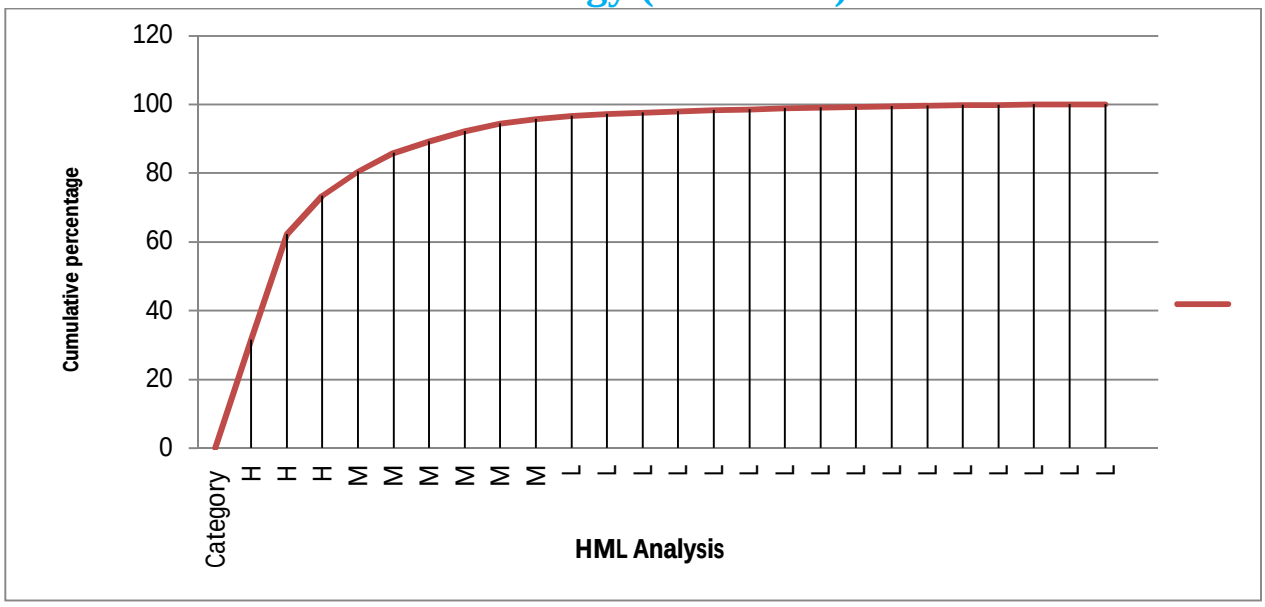

Fig.1 Shows HML analysis on the basis of cumulative of unit cost

V. RESULTS

TABLE 4
Shows the result of HML analysis

Category	Annual demand	% Annual demand	Annual usage (Rs)	% Annual usage
H	3	12	269001	27.28
M	7	28	168264	17.06
L	15	60	548763	55.66
Total	25	100	986028	100

ABC analysis on the basis of percent Annual demand is shows in fig.2.

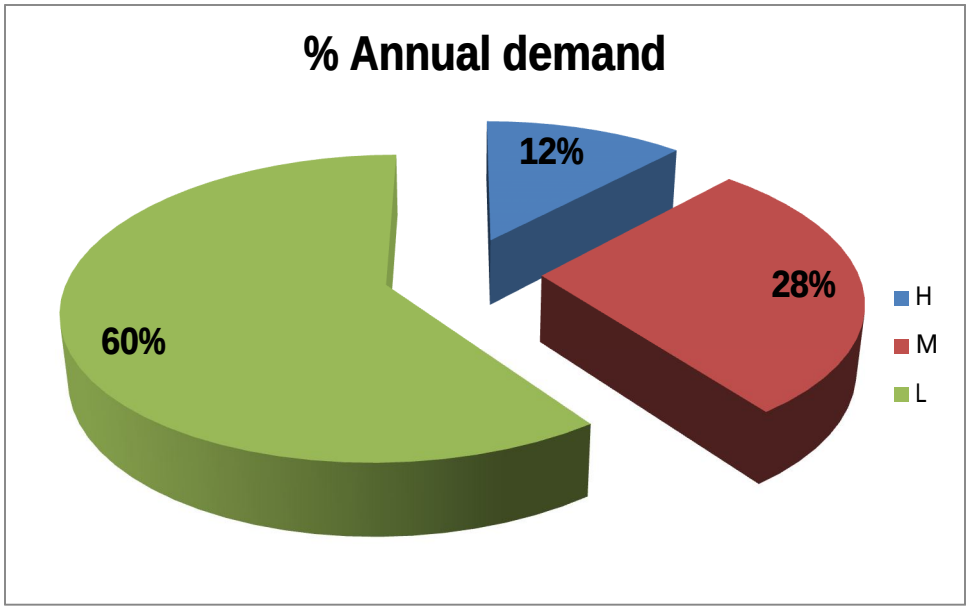

Fig.2. Shows percent item usage of the inventory items.

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HML analysis on the basis of percent Annual usage is shows in fig.3.

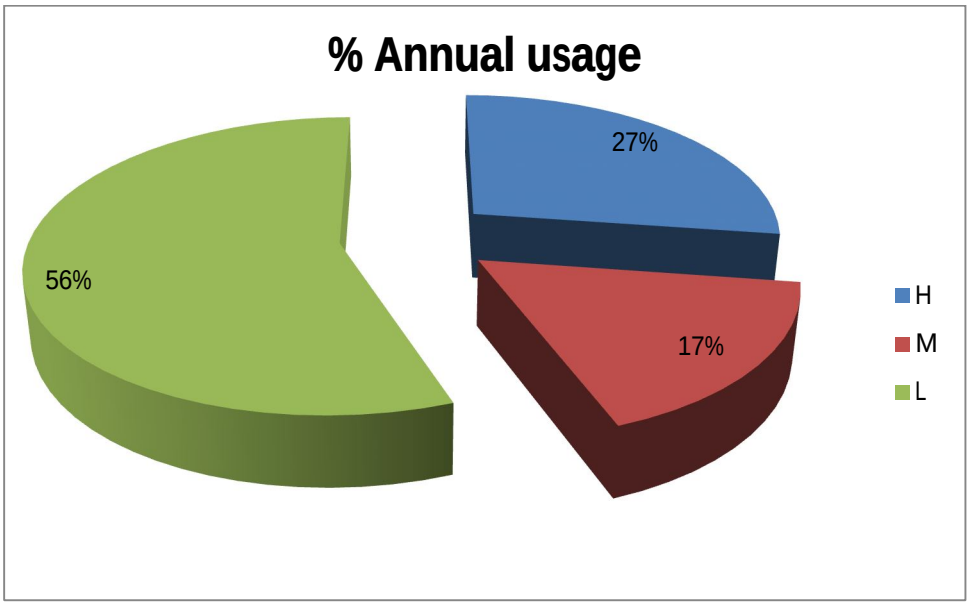

Fig.3. Shows percent annual usage of the inventory item.

VI. CONCLUSION

In manufacturing environment, an organization needs to maintain the balance between critical stock- outs and minimizing inventory costs material cos. From the above study we have found that this analysis help to the organization to manage the inventory item effectively not only for raw material but also for finished goods. It will help to understanding of problems occurs due to purchasing, inventory, material cost and safety stock.

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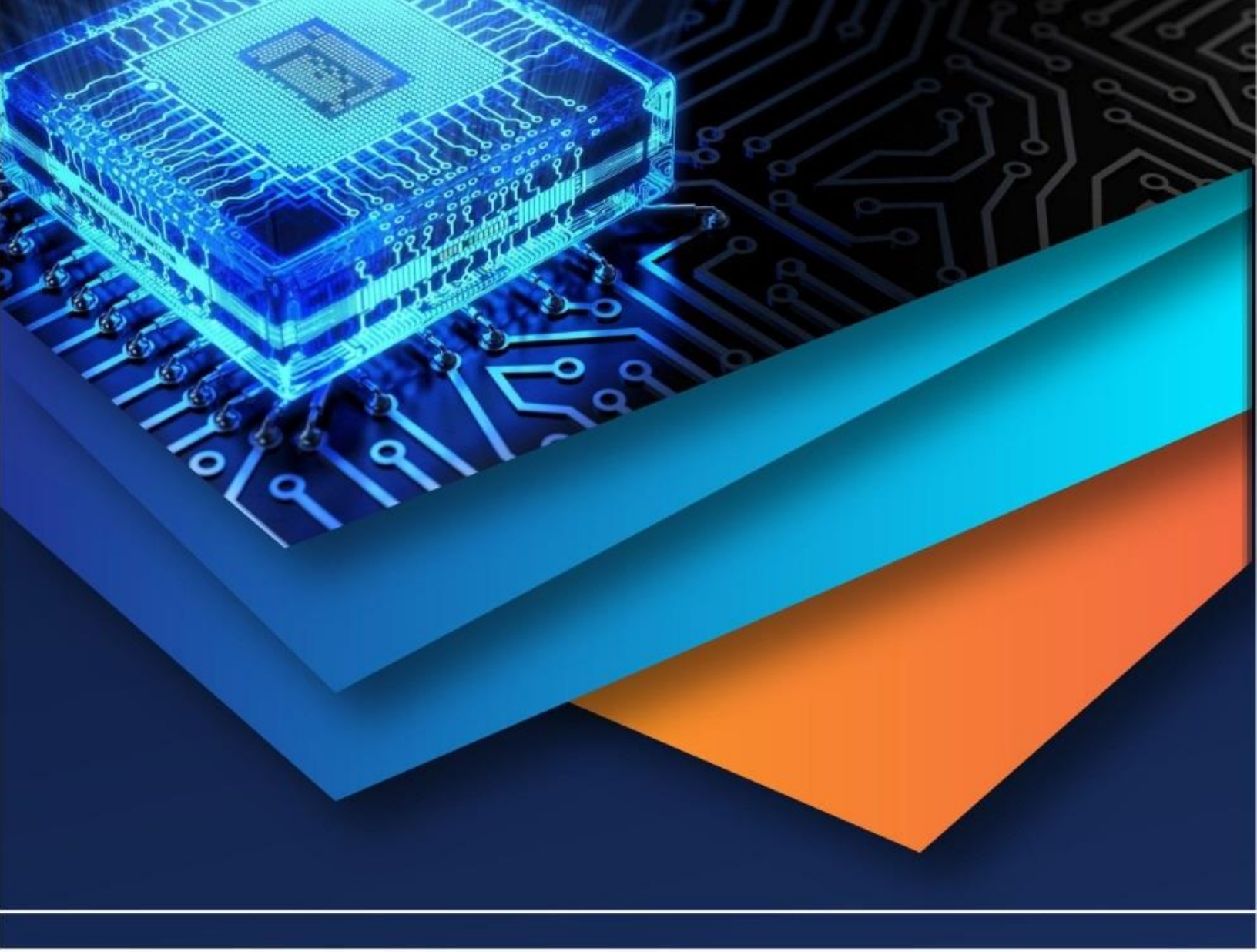

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