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ABC Analysis for Inventory Management-Case Study of Sponge Iron Plant

Yogesh kumar[1], Ashok lilhare[2], Amit Sahu[3,] Bhushan lal[4], Yushwant khaperde[5]

[1, 3, 4, 5]Student, [2] Assistant Professor Department of Mechanical Engineering, CSVTU Bhilai India

Abstract – An inventory management is most commonly used technique to manage inventory efficiently. There are several techniques to classify the inventory items the most classification technique is ABC analysis. In ABC analysis the items are classified into A, B & C classes based on the total cost usage. Data collection is mainly of 1 year through the general store manager and other staff involved in inventory control operation of sponge iron plant Rasmada.

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, XYZ, GOLF, S-OS etc. Here we shall focus on the ABC analysis techniques

II.   OBJECTIVE

A.   General objective
To categories the inventory items into A, B & C 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, XYZ, GOLF, S-OS etc. Here we shall focus on the ABC analysis techniques

A.   ABC analysis
"Reference [3] shows, ABC analysis is one of the most commonly employed inventory classification techniques. Conventional ABC classification was developed for use by General Electric during the 1950s. The classification scheme is based on the Pareto principle, or the 80/20 rule, that employs the following rule of thumb: "vital few and trivial many. "The process of ABC analysis classifies inventory items into A, B or C categories based on so-called annual dollar usage. Annual dollar usage is calculated by multiplying the dollar value per unit by the annual usage rate".

"Reference [4] shows, There are so many types of products classification and categorizations available for inventory optimization like ABC, XYZ, FSN, SDE, VED, HML etc. ABC analysis can be used for different purposes. Therefore one must carefully study the requirements before any of these categorizations are applied".

"Reference [5] shows, There are lots of assumptions for each categorization. ABC classification has an important assumption which is 80-20 rule. Another assumption is the planning horizon. There is no industry standards that define the Period of Analysis and this are randomly decided based on convenience".

B.   A-class item
These items are generally 10-15 % of total item and 60-70 % money spent on total inventory items.

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C. B-class item

These items are generally 20-25 % of total item and 20-30 % money spent on total inventory item.

D. C-class item

These items are generally 60-70 % of total item and 10-15 % money spent on inventory item.

TABLE 1

Shows particulars of ABC analysis

Particulars	A-class item	B-class item	C-class item
Control	High	Intermediate	Low
Requirement	Low	Intermediate	High
Check	Tight	Intermediate	No
Safety stock	High	Low	Rare

E. Procedure

To conduct ABC analysis, following steps are necessary:

1) Prepare the list of items and calculate their unit price, annual consumption,
2) Arrange items in the decreasing of their annual usage.
3) Calculate percentage of annual usage, cumulative of annual usage and then categories the inventory item.
4) Plot the graph on the basis of cumulative of annual usage and then categories the inventory items.

IV.   CASE STUDY

Step1. Prepare the list of items and calculate unit price, annual demand, Annual usage and percent of annual usage.

Step.2 Arrange the items in the decreasing order of their annual usage.

TABLE2

Shows name of item, unit price, annual demand, annual usage, & % annual usage of each item.

Item no.	Item	Unit cost (Rs.)	Annual demand (Units)	Annual usage (Rs.)	% Annual usage
1.	Diesel	49.27	9600 LTR	472992	26.46
2	Conveyor belt	1000	225	225000	12.58
3	SP 320 oil	147.65	1260 LTR	186039	10.40
4	Cement	270	360 BAG	97200	5.43
5	HLP 68 oil	147.65	630 LTR	93019.5	5.20
6.	S.I. copper wire 18SWG	609.90	147.6 KG	90021.24	5.03
7	Valve size 8"	73983	1 NO	73983	4.13
8	Copper wire 185WG	649.80	108.6 KG	70568.28	3.94
9	G.I. sheet 10 x 4	1066.66	60 NO	63999.6	3.58
10	Zest EP-2 grease	158	360 LTR	56880	3.18
11	Ceramic blanket	1824	30 NO	54720	3.06
12	Supratech WR-2 grease	131.88	364 LTR	48004.32	2.68
13	Silver nitrate	135000	0.3 KG	40500	2.26
14	Nomex paper 7NIL	1312.51	30 KG	39375.3	2.20
15	A.C. sheet 3MTR	573.16	60 MTR	34389.6	1.92
16	Bearing 6313/C3	3165.55	10 NO	31655.5	1.77
17	Welding electrode E310-16	1239	24 KG	29736	1.66
18	Cooler for dome	14729	2 NO	29458	1.64
19	Becktol red	845.6	30 KG	25368	1.41
20	Full LPG/RLN cylinder	1223.57	20 NO	24471.4	1.36

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Step3. Calculate cumulative of annual usage and then categories the inventory item.

TABLE 3

Show name of items, Annual usage, %Annual usage, Cumulative of annual usage & category for each item.

Item no.	Item	Annual usage (Rs.)	% Annual usage	Cumulative of annual usage	Category
1.	Diesel	472992	26.46	26.46	A
2	Conveyor belt	225000	12.58	39.04	A
3	SP 320 oil	186039	10.40	49.44	A
4	Cement	97200	5.43	54.87	B
5	HLP 68 oil	93019.5	5.20	60.07	B
6.	S.I. copper wire 18SWG	90021.24	5.03	65.1	B
7	Valve size 8"	73983	4.13	69.23	B
8	Copper wire 185WG	70568.78	3.94	73.17	B
9	G.I. sheet 10 x 4	63999.6	3.58	76.75	B
10	Zest EP-2 grease	56880	3.18	79.93	C
11	Ceramic blanket	54720	3.06	82.99	C
12	Supratech WR-2 grease	48004.32	2.68	85.67	C
13	Silver nitrate	40500	2.26	87.93	C
14	Nomex paper 7NIL	39375	2.20	90.13	C
15	A.C. sheet 3MTR	34389.6	1.92	92.05	C
16	Bearing 6313/C3	31655.5	1.77	93.82	C
17	Welding electrode E310-16	29736	1.66	95.48	C
18	Cooler for dome	29458	1.64	97.12	C
19	Becktol red	25368	1.41	98.53	C
20	Full LPG/RLN cylinder	24471.4	1.36	99.89	C

Step4. Plot the graph on the basis of cumulative of annual usage and then categories the inventory items.

X-axis shows = ABC classification   Y-axis
shows = Cumulative percentage   ABC
analysis on the basis of cumulative of annual usage is shown in fig.1

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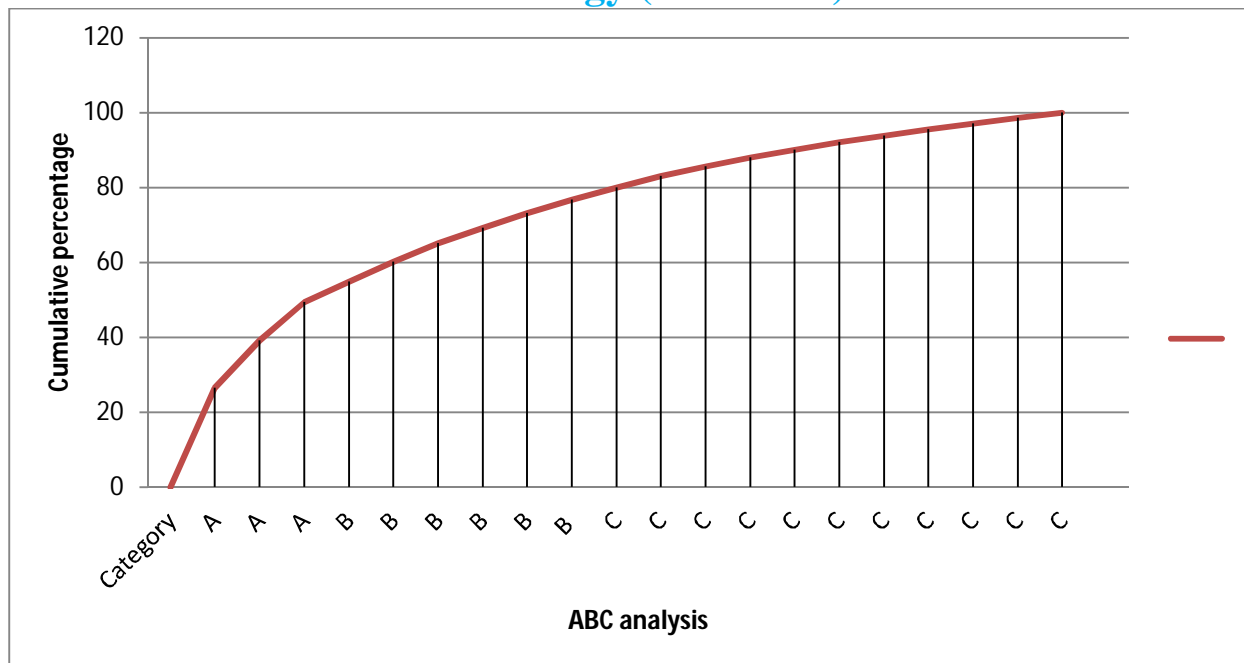

Fig.1 Shows ABC analysis on the basis of cumulative of annual usage

V.   RESULTS

TABLE 4
Shows the result of ABC analysis

Category	Annual demand	% Annual demand	Annual usage	% Annual usage
A	3	15	884031	49.46
B	6	35	488792.1	27.35
C	11	55	414557.8	23.19
Total	20	100	1787381	100

ABC analysis on the basis of percent Annual demand is shows in fig.2.
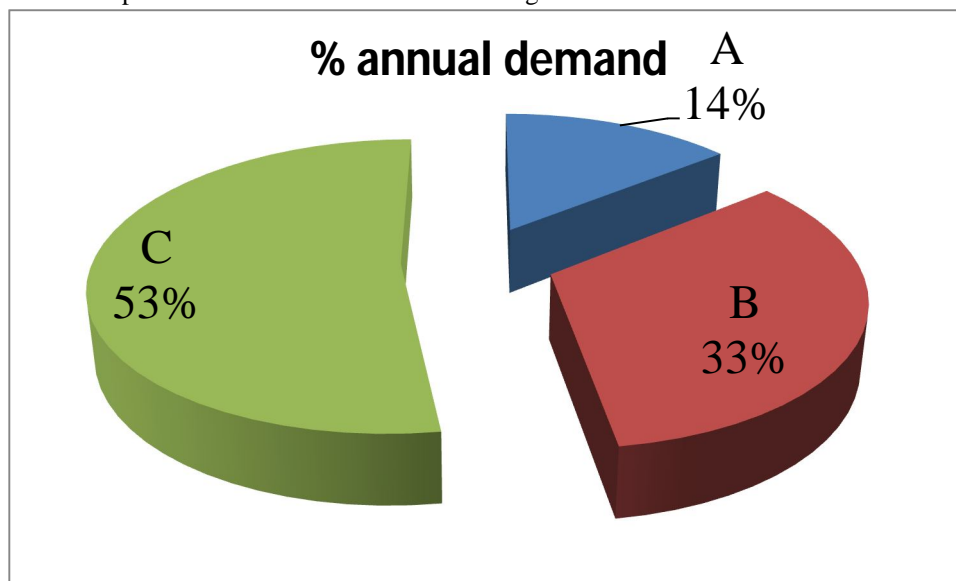
Fig.2. Shows percent item usage of the inventory items.

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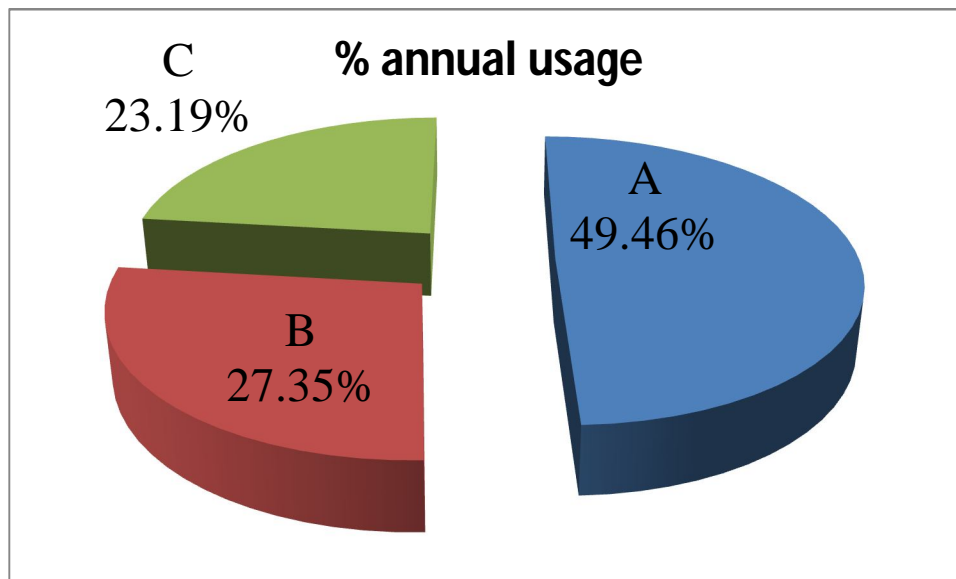ABC analysis on the basis of percent Annual usage is shows in fig.3.

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. From the above study we have found that this analysis help to manager to manage the inventory item effectively not only for row material but also for finished goods. It will help to understanding of problems occurs due to purchasing, inventory and safety stock. .

VII.   ACKNOWLEDGEMENT

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