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FSN Analysis for Inventory Management – Case Study of Sponge Iron Plant

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Abstract: An inventory management is technique which is generally used to manage the company effectively. The company wants to control their inventory cost, material cost, labor cost etc. There are several inventory techniques used in company such as FSN, XYZ, ABC, HML, VED and S-OS. In this study we shall focus on FSN analysis. In FSN analysis the items are classified into F, S and N classes based on Based on Turnover ratio. Data collection is mainly of 1 year through the general store manager of sponge iron plant. In these analysis only generally used items is used for FSN analysis.
Key Words: FSN analysis, inventory management, inventory control.

I. INTRODUCTION

Reference 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 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 FSN, XYZ, ABC, HML, VED, S-OS etc. Here we shall focus on the XYZ.

II. OBJECTIVE

A. General objective
To categories the inventory items into F, S & N class.

B. Main objectives
The main objective of this analysis is to minimize the inventory cost such as material cost, turnover cost &labor cost of the company.

III. METHODOLOGY

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

A. Fsn analysis (based on turnover ratio
Reference [3] shows, In any manufacturing industry, not all items are required with the same frequency. Some materials are quite regularly required, yet some others are required very occasionally and some materials may have become obsolete and might not have been demanded for years together. FSN analysis groups them into three categories as Fast-moving, Slow-moving and Non-moving (dead stock) respectively. Inventory policies and models for the three categories have to be different. While performing this particular analysis the turnover ratio of each item has to be calculated because the items are sorted and analyzed according to the turnover ratio it possesses."
"Reference [3] shows, The turnover ratio is calculated from the following formula-
Turnover Ratio= Annual Demand/Average Inventory.

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After that the annual usage of each item is calculated followed by calculation of percentage annual usage of each item. The annual usage is calculated from the following formula-
Annual Usage of each item= Annual Demand of each item x Unit Price of each item.
After this the percentage cumulative usage of each item is calculated. The percentage cumulative usage is calculated from the following formula-
Percentage Cumulative Usage of 1st item= Percentage Annual Usage of 1st item.
Percentage Cumulative Usage of 2nd item= Percentage Cumulative usage of 1st item + Percentage Annual Usage of 2nd item."

1) *F-class item:* Fast moving those items whose stock turnover ratio is greater than 3. It is generally used item and used in large amount. It is generally 10-15% of total item
2) *S-class Item:* Slow moving (S) those items whose stock turnover ratio is between 1 and 3. It is used in minimum amount as compared to F- class item. It is generally 30-35% of total item.
3) *N-class item:* Non moving (N) are those items whose stock turnover ratio is below 1. It is generally 60-65% of total item.

B. Particulars of FSN analysis

TABLE 1
Shows particulars of FSN analysis

Particulars	F-class item	S-class item	N-class item
Stock	High	Intermediate	low
Control	High	Intermediate	Low
Check	Tight	Intermediate	No
Safety stock	High	Low	Rare

C. Procedure of FSN analysis
The FSN analysis consists of fallowing basic Steps:
Prepare the list of items and calculate their unit cost, annual demand, annual usage & Arrange the items in the decreasing order otheir annual demand
Calculate the percentage of annual demand & cumulative percentage of annual demand.
Classification of inventory item into F, S & N classes.
Plot the graph on the basis of cumulative percentage of annual demand & category of FSN.

IV. CASE STUDY

A. Cash study for XYZ analysis
Step1. Prepare the list of items and calculate their unit cost, annual demand, and annual usage & arrange the items in the decreasing order of their annual demand

TABLE 2
Shows name of item, unit cost, annual demand and annual usage

Item no.	Item	Unit cost	Annual demand	Annual usage
1.	Diesel	49.27	9600 LTR	472992
2	SP 320 oil	147.65	1260 LTR	186039
3	HLP 68 oil	147.65	630 LTR	93019.5
4	Supratech WR-2 grease	131.88	364 LTR	48004.32
5	Cement	270	360 BAG	97200
6.	Zest EP-2 grease	158	360 LTR	56880
7	Conveyor belt	1000	225	225000
8	S.I. copper wire 18SWG	609.9	147.6 KG	90021.24

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9	Copper wire 185WG	649.8	108.6 KG	70568.78
10	G.I. sheet 10 x 4	1066.66	60 NO	63999.6
11	A.C. sheet 3MTR	573.16	60 MTR	34389.6
12	Ceramic blanket	1824	30 NO	54720
13	Nomex paper 7NIL	1312.51	30 KG	39375
14	Becktol red	845.6	30 KG	25368
15	Welding electrode E310-16	1239	24 KG	29736
16	Full LPG/RLN cylinder	1223.57	20 NO	24471.4
17	Bearing 6313/C3	3165.55	10 NO	31655.5
18	Cooler for dome	14729	2 NO	29458
19	Valve size 8”	73983	1 NO	73983
20	Silver nitrate	13500	0.3 KG	40500

Step2. Calculate the percentage of annual demand & cumulative percentage of annual demand.
Step3. Classification of inventory items into F, S & N class.

TABLE 3
Shows name of item, annual demand, % annual demand cumulative percentage and category

Item no.	Item	Annual demand	% Annual demand	Cumulative percentage	Category
1.	Diesel	9600 LTR	72.06	72.06	F
2	SP 320 oil	1260 LTR	9.46	81.52	F
3	HLP 68 oil	630 LTR	4.73	86.25	S
4	Supratech WR-2 grease	364 LTR	2.73	88.98	S
5	Cement	360 BAG	2.7	91.68	S
6.	Zest EP-2 grease	360 LTR	2.7	94.38	S
7	Conveyor belt	225	1.69	96.07	S
8	S.I. copper wire 18SWG	147.6 KG	1.107	97.177	S
9	Copper wire 185WG	108.6 KG	0.8151	97.992	N
10	G.I. sheet 10 x 4	60 NO	0.45	98.442	N
11	A.C. sheet 3MTR	60 MTR	0.4503	98.892	N
12	Ceramic blanket	30 NO	0.225	99.117	N
13	Nomex paper 7NIL	30 KG	0.225	99.342	N
14	Becktol red	30 KG	0.225	99.567	N
15	Welding electrode E310-16	24 KG	0.1841	99.7511	N
16	Full LPG/RLN cylinder	20 NO	0.1501	99.7012	N
17	Bearing 6313/C3	10 NO	0.075	99.9762	N
18	Cooler for dome	2 NO	0.015	99.9912	N
19	Valve size 8”	1 NO	0.0075	99.9982	N
20	Silver nitrate	0.3 KG	0.00225	100	N

Step4. Plot the graph on the basis of cumulative percentage of annual demand & category of FSN
X axis shows- Classification of FSN analysis
Y axis shows- Cumulative percentage of annual demand

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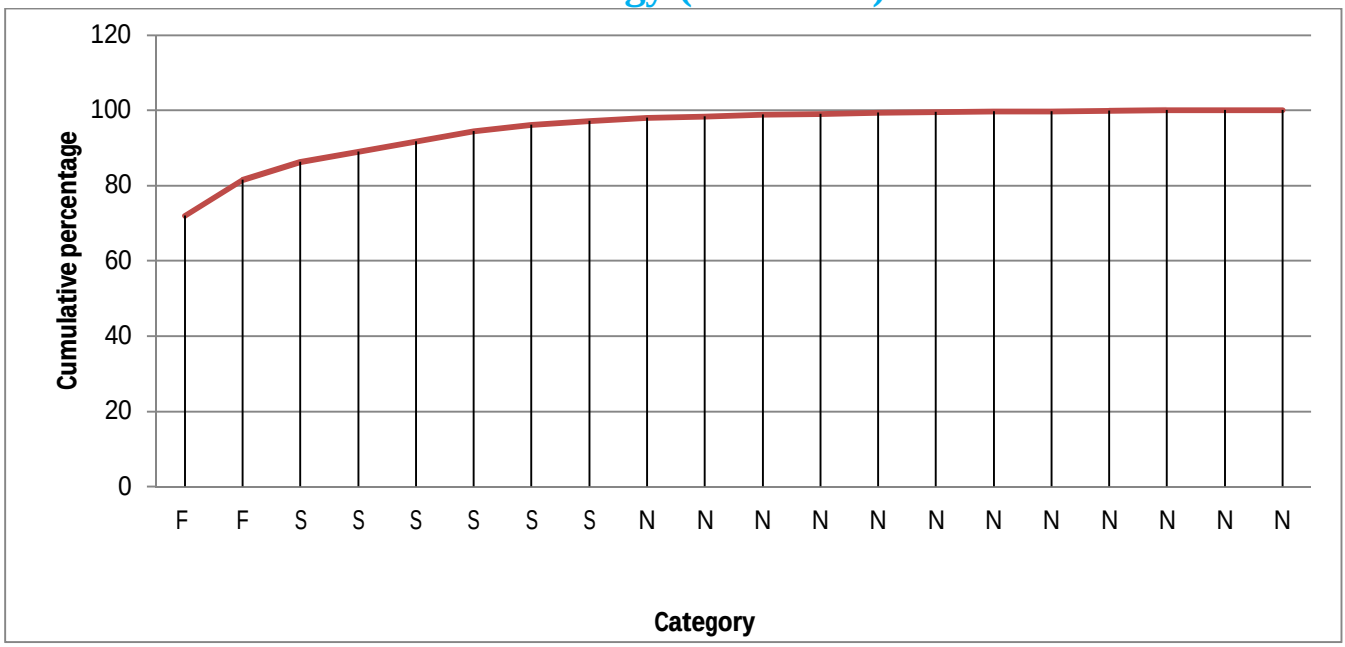

Figure1. Shows graph between cumulative percentage of annual demand & category of FSN

V. RESULTS

A. Result of FSN analysis

In this analysis only generally used twenty items is used. So their result is shown below

TABLE 4

Shows the result of HML analysis

Category	Annual demand	%Annual demand	Item used	% item used
F	10860	81.52	2	10
S	2086.6	15.67	6	30
N	375.9	2.81	12	60
Total	13322.5	100	20	100

FSN analysis on the basis of percent Annual demand is shows in figure2.

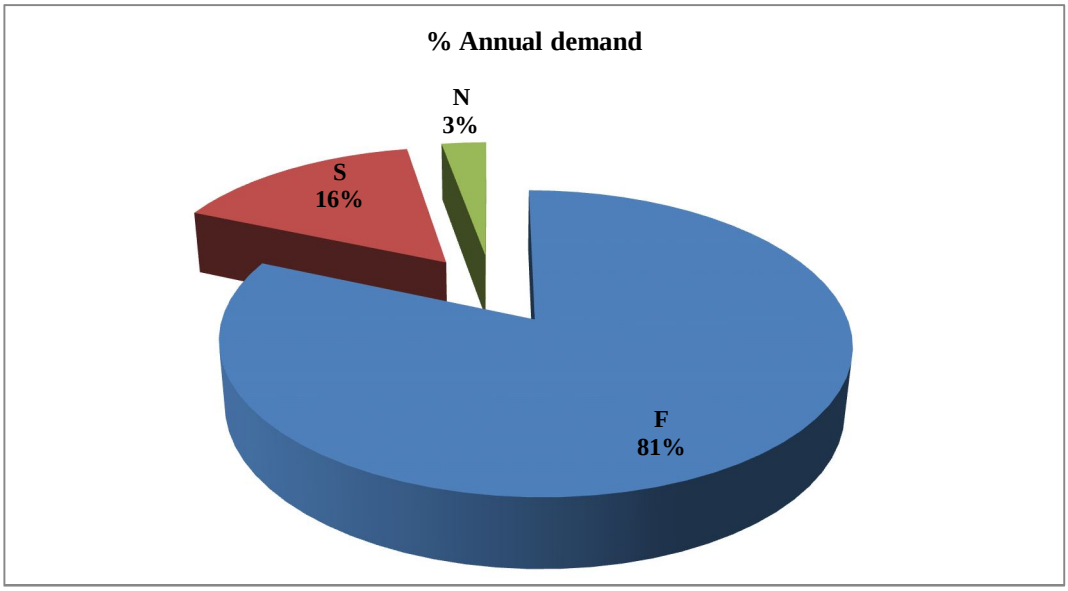

Figure2. Shows FSN analysis on the basis of percent Annual demand

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FSN analysis on the basis of %item used is shows in figure 3.

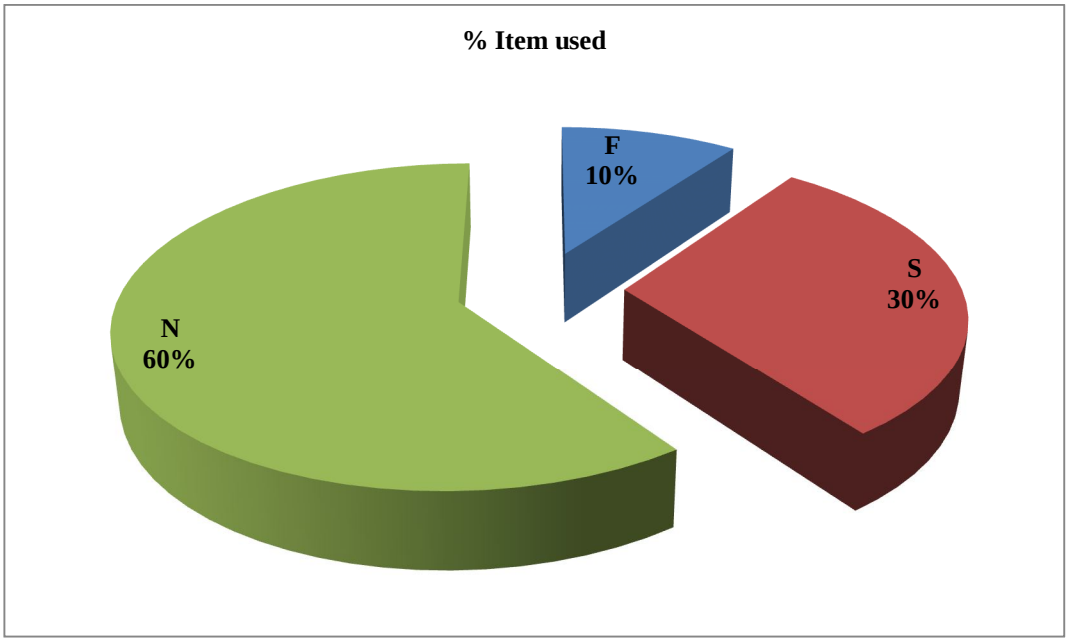

Figure3. Shows FSN analysis on the basis of %item used

VI. CONCLUSION

In today's manufacturing atmosphere, company wants to balance between critical stock- outs and minimizing inventory costs material cost. From the above study we have found that this analysis help to managing inventory item effectively for raw material. It will help to understanding of problems occurs due to buying the inventory row material cost, safety stock.

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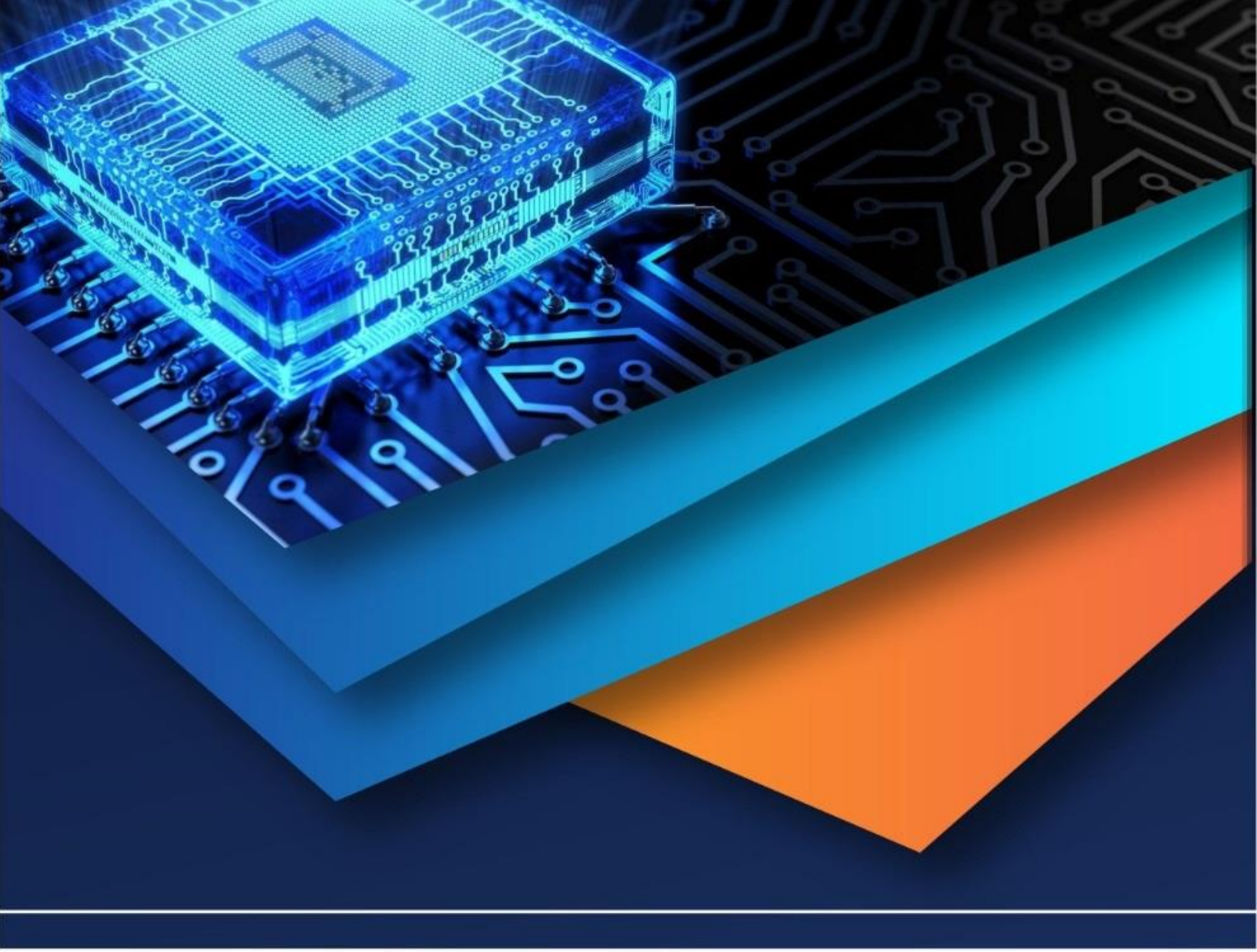

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