



International Journal of Engineering, Business and Enterprise Applications (IJEBA)

www.iasir.net

An Inventory Control using ABC Analysis and FSN Analysis

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Abstract: To achieve optimum inventory replenishment is significantly difficult due inherent uncertainties in demands and supply which resulting in loss of sales or keeping excessive inventories. An unkempt inventory can take up to one-third of an organization's annual investment. Therefore, in order to compete with invariably erratic demands, it is not only challenging to develop an intelligent system to maintain and control an optimum level of inventory but has also become mandatory. Here we have tried to study the inventory control system of a manufacturing industry using ABC and FSN.

Keywords: ABC analysis, inventory control, annual investment, FSN analysis.

I. Introduction

Inventory management is significant for effective and efficient organization. It is also important in the control of inventories that have to be stored for later use in case of production. The goal of inventory management involves having to balance the conflicting economics of not wanting to hold too much stock.

Inventory management is the activity involved in developing and managing the inventory levels of raw materials, semi-finished materials (work-in-process) and finished goods so that adequate supplies are available and the costs of over or under stocks are low.

The studied Company is a public sector wheel manufacturing company. It is observed that more parts damage and reduced company's revenue. It was also observed that company does not always adopt inventory optimization model to evaluate their inventory using raw materials as a parameter for measurement. This paper intends to discuss the inventory control technique for a manufacturing company by using the ABC analysis to promote a better material management policy that would affect the company's profit.

Following are the objectives of this research:-

- a) To study and understand inventory control techniques in industry.
- b) To determine whether or not inventory management in company, can be evaluated and understood using ABC-analysis in inventory management.

II. Literature Review

Inventory management is the accurate tracking of all materials in the company's inventory. The company has purchased these items from another supplier. There are three possible areas of loss that are reduced through effective inventory management: shrinkage, misplacement, and short shipments. There are various types of inventory control analysis techniques. Here we shall focus on the ABC analysis. It is possible to utilize the concept of ABC model in formation of rational inventory policy which should give the best possible service level to production while minimizing investment costs. ABC analysis tends to measure the significance of each item of inventory in terms of value. According to Onwubolu and Dube (2006), when ABC analysis is applied to an inventory situation, it shows the importance of items and level of control placed on the items.

ABC classification is a method of classifying inventory items according to the money value to a firm. Class 'A' items normally range from 10% to 15% of all inventory items and account for between 70% and 75% of total annual consumption value. The class 'B' items normally range from 15% to 20% of all inventory items and account for 20% of total annual consumption value. The Class 'C' items normally constitute 70% to 75% of all inventory items and account for 5% to 10% of total annual consumption value.

Steps for implementation of ABC analysis are:

1. Prepare the list of items and estimate their annual consumption (units).
2. Determine unit price (or cost) of each item.
3. Multiply each annual consumption by its unit price (or cost) to obtain its annual consumption in rupees (annual usage).

4. Arrange items in the descending order of their annual usage starting with the highest annual usage down to the smallest usage.
5. Calculate cumulative annual usages and express the same as cumulative usage percentages. Also express the number of items into cumulative item percentages.
6. Graph cumulative usage percentages against cumulative item percentages and segregate the items into A, B and C categories.
7. To separate items into A, B and C categories, first few items which contribute between 70% – 75% of cumulative usage can be considered as A category, next few items which together with A category items segregated earlier contribute between 80% – 90% of cumulative usage can be considered B category, and left over items can be taken as C category.

Advantages of ABC Analysis

- a) It ensures a closer and a more strict control over such items, which have high investment.
- b) It releases working capital, which would otherwise have been locked up for a more profitable channel of investment.
- c) It reduces inventory-carrying cost.
- d) It enables the relaxation of control for the 'C' items and thus makes it possible for a sufficient buffer stock to be created.

A. FSN Analysis:

Classification based on Frequency of Issues/Use:

F, S & N stand for fast moving, slow moving and Normal moving items. This form of classification identifies the items frequently issued, less frequently issued for use and the items which are not issued for longer period. This classification helps spare parts management in establishing most suitable stores layout by locating all the fast moving items near the dispensing window to reduce the handling efforts. Also, attention of the management is focused on the Non-Moving items to enable decision as to whether they are required in the future or they can be salvaged. Experience shows that many industries which are more than 15 years old have more than 50% of the stock as non-moving spares. Even if a few of them are disposed off and the locked up capital is made available, it will make available additional working capital to the organization. Action for disposal should be taken based on the value of each item of spare.

III. Research Methodology

Research methodology represents the strategies involved in collecting and analyzing data. This section attempts to give a direction and manner for research work. This includes the mode of data collection, analysis and the research design.

A. Case Study Strategy:

Robson (2002) defines case study as a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence.

For research project, current situation of inventory management in company was investigated by using multiple sources of evidence, for instance, the interviews with the manager and other related staff of the company. Direct observation on inventory operation was also conducted. Case study approach was used to conduct the research project. Single-case study strategy helped to understand the research context and acquire deep understanding about specific management issues.

B. Methods of Data collection:

Primary and secondary sources provided essential information for this research work. These sources include:

1. Interview with some key personnel in the stores, purchasing, production and inventory departments of the company.
2. Record analysis of relevant data was obtained from the annual reports, product catalogue, sales reports, purchasing reports of the company and the related journals.
3. Theoretical background information was gathered through review of related literature on ABC-model.
4. E-mails were also used to send out questions and get responses.

C. Analysis:

Table I: ABC Analysis

Item	Annual Demand	% Annual Demand	Unit Price(Rs)	Annual Usage	% Annual Usage	% Cumulative Annual Usage	Category
2mm copper coated saw wire	3,00,000 Kg	66.07	148	4,44,00,000	61.98	61.98	A
1.6mm copper coated saw wire	1,00,000 Kg	22.02	148	1,48,00,000	20.66	82.64	A
Insert SNMM 190616	2112 pcs	0.46	1100	23,23,200	3.24	85.88	B
Insert SCMT 120408	9432 pcs	2.077	900	84,88,800	11.85	97.73	B
Safety Shoes	1300 pairs	0.29	750	9,75,000	1.36	99.09	B
Safety Mask	21000 pcs	4.62	10	2,10,000	0.29	99.38	C
3M polish paper	8500 pcs	1.87	10	85,000	0.12	99.5	C
3M FLAP DISC	10920 pcs	2.41	20	2,18,400	0.31	99.81	C
Grease Castrol ball BRG AP3/shell MP	520 Kg	0.11	151	78,520	0.12	99.92	C
Antispatter spray/Silicon spray	260 pcs	0.057	200	52,000	0.07	100	C
			Total	7,16,30,920			

Table II FSN Analysis:

Here for analysis we have considered 10 materials. Period of analysis is 15 days Calculation of consumption rate and average stay of the material in the inventory. Opening balance is 50.

Date	Receipt Qty.	Return Qty.	Adjustment Qty.	Issue Qty.	Closing Balance	Inventory holding days
4/07/2015	10	0	0	0	60	60
5/07/2015	15	7	0	15	67	67
6/07/2015	0	0	0	0	67	194
7/07/2015	0	0	0	0	67	261
8/07/2015	0	0	5(+)	0	72	333
9/07/2015	20	0	0	0	92	425
10/07/2015	0	0	0	12	80	505
11/07/2015	0	4	0	0	84	589
12/07/2015	0	0	0	0	84	673
13/07/2015	10	0	0	7	87	760
14/07/2015	0	0	0	0	87	847
15/07/2015	0	0	0	12	75	922
16/07/2015	0	0	0	0	75	997
17/07/2015	10	0	3(-)	0	82	1079
18/07/2015	0	0	0	0	82	1161
Total	65	11	2(+)	46	-	-

Average stay of the material = Cumulative No of Inventory Holding Days/ (Total quantity received + Opening Balance) =1161/115 =**10.09 Days**

Consumption Rate = Total Issue Qty/Total Period Duration =46/15 =**3.06 Nos/Day**

Now list down the materials with average stay and consumption rate

Item Code	Average stay	Consumption rate
A	10.09	3.06
B	7.5	5.2
C	8.23	4.71
D	4.2	2
E	6	5.1
F	12	5.76
G	8	3.98
H	9.11	4.48
I	11.2	5.23
J	7.21	4

Every company has its policy for defining FSN. Here FSN has been taken as F-10%, S-20%, and N -70%.

Item Code	Average stay	Cum. Average stay	% Average stay	FSN Classification
F	12	12	14.34	N
I	11.2	23.2	27.77	N
A	10.9	33.29	39.85	N
H	9.11	42.4	50.75	N
C	8.23	50.63	60.61	N
B	7.5	66.13	79.16	S
J	7.21	73.34	87.79	S
E	6	79.34	94.97	F
D	4.2	83.54	100	F

FSN classification only on the basis of consumption rate:

Item Code	Consumption rate	Cum. Consumption rate	% Consumption rate	FSN Classification
F	5.76	5.76	13.24	F
I	5.23	10.99	25.25	F
B	5.2	16.19	37.2	F
E	5.1	21.29	48.92	F
C	4.71	26	59.74	F
H	4.48	30.48	70	F
J	4	34.48	79.23	S
G	3.98	38.46	88.37	S
D	3.06	41.52	95.4	N
A	2	43.52	100	N

*Due to non-disclosure clauses the name of materials considered for FSN analysis can't be disclosed.

IV. Findings

Our analysis shows that the ABC analysis is followed by wheel manufacturing company and there is relation between annual demand and total costs of the materials.

As compare to ABC analysis, FSN works with usage rate and ABC works with annual consumption value. As per the importance of materials in production ABC and FSN are used. FSN techniques significantly reduces unnecessary motions while issuing materials if they are arranged accordingly. From the classification F items on the basis consumption rate F items are those which moves fastly and constitutes 60% of total components. S items are those which moves slowly constitute 20% of total components and N items are those which don't move (Non-moving items) constitute 20%.

V. Conclusion

Inventory analysis and control has become inevitable for a manufacturing industry. In order to refrain from having an inventory go dead it is of utmost importance to stay abreast with the number and condition of items in that particular inventory. In this regard both periodic and continuous techniques can be used for appraising the stats of the stocks. Once the figures are accurately determined it is yet again very important to be able to further determine the level at which a particular item's stock needs to be maintained. For which calculations and analysis are

mandatory. The case study discusses ABC analysis methods of inventory control analysis of a wheel manufacturing industry. From the above study we have found that the priorities of the items changes according to different inventory analysis techniques.

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