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Inventory Management in a Pump Manufacturing Industry

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Abstract:

This paper focuses on problems faced in inventory management in the industry. The inventory of materials constitutes the most significant part of current assets and working capital in any organization. This study aims to examine the whole inventory management process and find out the key factors which are leading to an increase in the expense of the industry. The methodology used in this study is based on unstructured interviews, on-site study, process understanding, and annual report analysis. The mainaim of the study is to provide suitable guidelines for industrialists that will help them to ensure product availability in right quantity at right time.

Keywords **— Inventory Management, Manufacturing Industry, Safety Stock, Profit.**

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I. INTRODUCTION

By effectively driving sales and reducing unnecessary costs competitors are keeping ahead in today's uncertain economy. By having an appropriate inventory control & management plan SMEs can stand a chance in today's environment. Inventory management has prominence not only in retail stores but also in industries. Maintaining inventory in the right quantity is necessary for any company dealing with physical products, including manufacturers, wholesalers, and retailers. SMEs frequently face two occurring problems namely stock-out and overstock. This leads to failure in maintaining product availability at the lowest possible inventory cost. Customer satisfaction is affected by the lack of product availability which is the driving force behind any business. Proper inventory control techniques help to overcome these problems [1].

An inventory is a list of movable items that are necessary to make a product and to keep the equipment and machinery operational.

A business' inventory is an asset intended for sale to customers. Inventories are stockpiled items that make up the product a firm sells, as well as the components that go into that product [2].

Raw materials or components are transported to a warehouse's receiving area and placed in stock areas or on shelves as part of inventory management. The items may be delivered straight to the stock area rather than a reception area in smaller businesses with limited physical space. Unfinished items are subsequently transported from storage locations to manufacturing facilities, where they are finished. If finished items are not delivered to clients immediately, they may be returned to storage locations before being sent. Batch numbers, serial numbers, product prices, quantity of the products, and timeframes are all used in managing inventory to keep a track of commodities as they travel through a process.

II. PROBLEM IDENTIFICATION

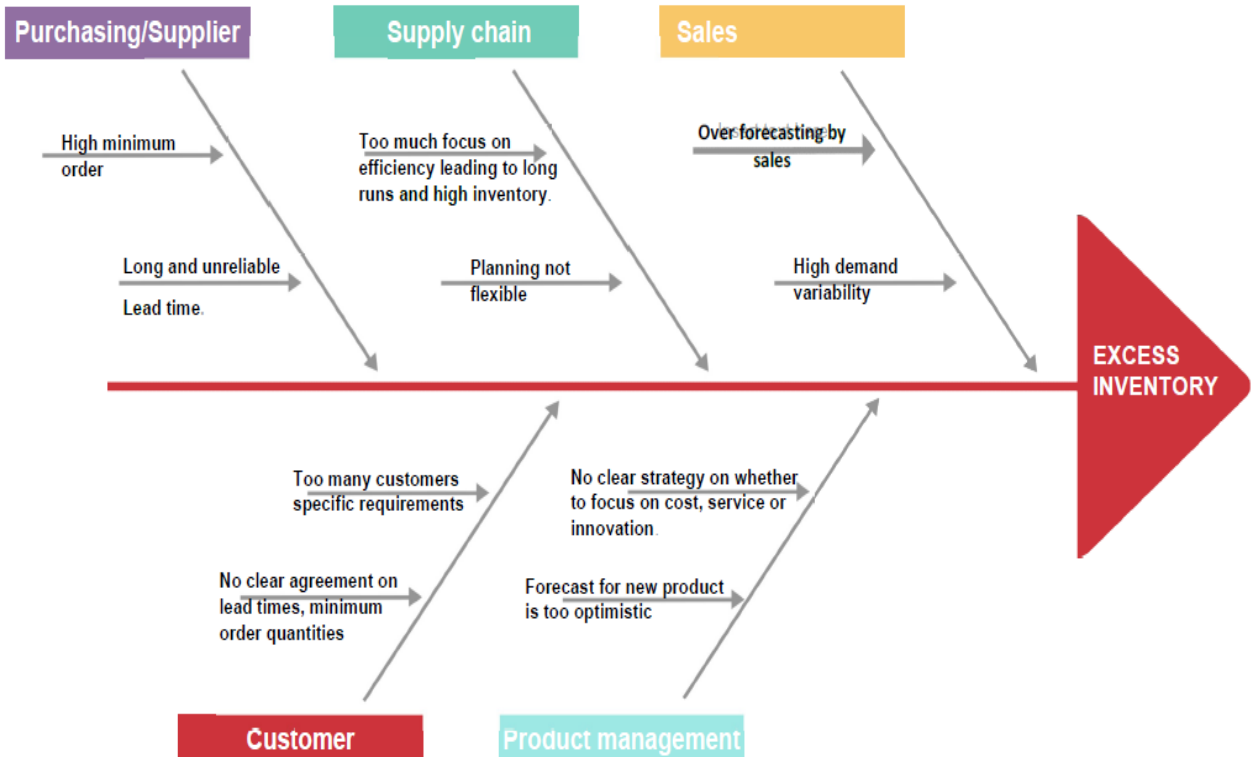

Figure 2.1 Fishbone diagram of Excess Inventory

As ORBIT PUMPS & SYSTEMS PVT LTD is a small-scale industry thus have no proper inventory control as shown in the cause-and-effect diagram above, in a manufacturing activity, inventories control plays an important role in ensuring the smooth running of a company. The world market forced all organizations to compete not only in price or quality, but also in technology, innovation, reliability, and information technology. Good inventory control can not only save costs but also helps the organization to serve the demand of their customers quickly and efficiently.Stocks are an investment that helps with production and/or serving consumers. Without a doubt, an insufficient supply of inventories may grind industrial processes to a standstill.As a result, inventory should be managed to maintain the seamless operation of a business.

III. RESEARCH METHODOLOGY

This article provides a case study of four alternative inventory control approaches for a manufacturing company's inventory management system. Although there are various control strategies for ensuring good inventory management, three of them are used here and are explained below.

A. ABC Analysis

ABC analysis is a corporate term that refers to a process for organizing inventories that is commonly used in warehouse management. 'Selective Inventory Control' is another name for it. ABC analysis allows you to discover goods that will have a substantial influence on overall inventory costs, as well as distinct types of stock that will require different management and controls. Inventory items

are valued (item cost multiplied by amount issued/consumed in period) and the findings are then sorted in an ABC analysis. The results are usually divided into three bands. ABC codes are the names of these bands. ABC CODES

Typically, "A class" inventory will comprise products that account for 80% of total value or 20% of total items.
Around 15% of overall value, or 30% of total things, will be in "B class" inventory.
The remaining 5% of inventory, or 50% of total products, will be classified as "C class." ABC Analysis is comparable to the Pareto principle in that the "A class" group accounts for a big percentage of total value but a small percentage of overall inventory volume.
The following formula is used to calculate the ABC categorization scheme:

Annual Demand x Unit Value Equals Annual Consumption

B. Safety Stock

A company's safety stock is indeed the stock it keeps in excess of its lead-time requirements. Companies keep safety stock on hand in case of a stock-out. Because demand is unpredictable, safety stock (SS) is essential for meeting demand if it surpasses expectations.Carrying too much safety stock increases the holding costs of the supply chain. As a result, the key to any supply chain's success is to strike a balance amongst safety stock and customer pleasure. The following formula is used to calculate safety stock when demand is constant:

$$SS = Z \times D \times \sigma L$$

where, D = Demand per year (units)

Z = Standard Normal Value

σL = Standard deviation of Lead Time [2].

C. Economical Order Quantity (EOQ)

Ordering costs, which are incurred while communicating an order, and holding costs, which are incurred when maintaining stocks, are two major expenses in inventory management. Items should be bought regularly in small batches to save carrying costs; however, this will raise the ordering cost. Because these two expenses are diametrically opposed, a novel methodology is necessary to achieve a balance.The economic order quantity (EOQ) model may be used by location managers in charge of inventory control to lower overall inventory expenses. It determines the optimal quantity that minimizes the overall cost of stocked material (including ordering and holding charges). The following formula is being used to evaluate the economic order quantity (EOQ) and economical order frequency over the period of a year:

Where,

D = Demand per year (units)

S = Re-order cost/ Procurement cost

H = Carrying or holding cost/ unit/ year

n = D/EOQ

EOQ = sqrt(2DH/S)

EOQ = Economic order quantity [2]

The EOQ is a mathematical formula that determines the point at which the total of order costs and inventory carrying costs is the minimum. Consequently, the most cost-effective amount to buy is determined. This is known, order quantity in purchasing and the production lot size in manufacturing.

D. HML analysis

The High, Medium, and Low (HML) analysis carries the same methodology as ABC analysis. Inventory goods should be presented in decreasing order of unit value, and management is responsible for setting limitations for three categories.

The HML analysis is useful for maintaining department intake control, determining the regularity of confirmation, and managing purchases.

When the goal is to retain order over intake at the department level, senior staff will be authorised to draw materials from the stores for H class products, next relatively low level in status for M class items, then even lower-level staff for L class items. HML analysis may also be used to plan cycle counts. H class items would be recorded frequently, M category items would be noted less frequently, while L classed materials would be noticed least commonly in comparison to H and M class.

Inventory turnover ratio

The times a company's inventory has been turned over which means selling and restocking of inventory over a period of time is known as Inventory Turnover Ratio. It is also used to forecast the duration for selling the current inventory. Ratio of the price of items sold by the mean inventory for the same time is how to calculate turnover ratio of a company. A healthy sales outcome is determined by a higher turnover ratio. It also helps determine how effectively one's inventory is being managed, also known as stock control, in which the business has a complete sense of in-hand inventory.

Inventory Turnover Ratio =
Cost of Goods Sold / Avg. Inventory

Averageinventory=
(Beginninginventory + ending inventory) / 2

IV. CALCULATIONS

Necessary data for this study were collected from Orbit Pumps Pvt Ltd. Some data were collected by Interaction with personnel of theshop floor, direct observation and the remaining data were collected from monthly purchase and sales records.

TABLE 1

Sr No.	Item Name	Unit cost	Demand per year
1	oil seal	33	831
2	sleeve ceramic 1.3/8"	484	396
3	Rotary seal	1668	936
4	Sleeve SS-316 (1.375")	660	320
5	Casing SS-316 1-5 (HRZ/VSP)	2744	223
6	Impeller SS-316/CF8M 1-5 (HRZ/VSP)	296	131
7	Stationary Seal Ceramic 1.3/8"	424	256
8	CI casting (per kg)	55	29648.3
9	AMTPP pump parts	1600	340
10	Coupling RRL/MSS	1581	330
11	Bearings	658	1129
12	Bush Teflon	223	240
13	Stationary Seal IM (SIC) 1.375"	1265	314
14	ROD SS-304(per kg)	582	626.95
15	Coupling L/M 100	250	177
16	Gland Plate Hylum	303	475
17	Mech Seal IM SIC V/s Carbon + Sleeve 1 1/8"	2090	3067
18	Stuffing Box SS – 316 1-7/2-6 (HRZ/VSP)	1847	300
19	Lock Nut+Washer KM - 5/6	37	600
20	Foundation Bolts(per kg)	76	500
21	Base Frame	1492	90
22	Mech Seal IM SIC V/s SIC 1.375"	3200	20
23	Ferrul nut	36	400
24	Base Frame MS	1590	359
25	TEFLON BUSH19 X63X100	1090	10
26	PTFE Bush 100x38x100	2590	10
27	ROD SS-316(per kg)	215	383.2

28	Sheet MS 8x4(per kg)	60	1309.5
29	Pipe SS(per kg)	285	767.45
30	O Ring Rubber 75x82x3.5	10	200
31	Brass Nut Ferul Set Elbow 3/8" x 3/8"	135	100
32	MS Flats(per kg)	44	1131.8
33	nut	65	610
34	ss rod 316(per kg)	300	348.8
35	ss plate 316(per kg)	306	169
36	ms plate(per kg)	75	713.25
37	nut m10	3	2000
38	nut ss m12	5	1200
39	mechanical seal	5000	29
40	Motor 1 HP	4821	17
41	Motor 2 HP	13000	21
42	Motor 3 HP	16600	49
43	Motor 5 HP	21099	29
44	Motor 7.5 HP	29926	11
45	Motor 10 HP	16852	13
46	Motor 15 HP	28597	18
47	T Type Mating Ring Ceramic Size 1.375	424	160
48	Impeller Nut ST - SS	80	269
49	Channel MS(per kg)	37	1712
50	Angle MS 25 x 3 mm(per kg)	43	2637.6

A. ***Computational steps***

To categorise things into categories A, B, and C, we first computed yearly consumption of each item by determining the product of unit cost and demand for each item. Arranging items into the descending order of their annual usage. Following that, the percentage yearly consumption as well as the percentage cumulative usage of each item are calculated, and all items are classified into the appropriate A, B, and C categories using the ABC classification technique, as shown in the table-2 below.

TABLE 2

Sr No.	Item Name	Unit cost	Demand per year	Annual Usage	%Annual usage	%Cumulative usage	Category
1	Mech Seal IM SIC V/s Carbon + Sleeve 1 1/8"	2090	3067	6410030	33.738	33.738	A
2	CI casting (per kg)	55	29648.3	1630657	8.583	42.321	A
3	Rotary seal	1668	936	1561560	8.219	50.540	A
4	Motor 3 HP	16600	49	813400	4.281	54.821	A
5	Bearings	658	1129	743258	3.912	58.734	A
6	Motor 5 HP	21099	29	611871	3.221	61.954	A
7	Casing SS-316 1-5 (HRZ/VSP)	2744	223	611801	3.220	65.174	A
8	Base Frame MS	1590	359	570810	3.004	68.179	A
9	Stuffing Box SS - 316 1-7/2-6 (HRZ/VSP)	1847	300	554100	2.916	71.095	A
10	AMTPP pump parts	1600	340	544000	2.863	73.958	A
11	Coupling RRL/MSS 95	1581	330	521813	2.746	76.705	A
12	Motor 15 HP	28597	18	514746	2.709	79.414	A
13	Stationary Seal IM (SIC) 1.375"	1265	314	397210	2.091	81.505	B
14	ROD SS-304(per kg)	582	626.95	364797	1.920	83.425	B

15	Motor 7.5 HP	29926	11	329186	1.733	85.157	B
16	Motor 2 HP	13000	21	273000	1.437	86.594	B
17	Motor 10 HP	16852	13	219076	1.153	87.747	B
18	Pipe SS(per kg)	285	767.45	218723	1.151	88.899	B
19	Sleeve SS-316 (1.375")	660	320	211200	1.112	90.010	B
20	sleeve ceramic 1.3/8"	484	396	191664	1.009	91.019	C
21	mechanical seal	5000	29	145000	0.763	91.782	C
22	Gland Plate Hylum	303	475	144083	0.758	92.541	C
23	Base Frame	1492	90	134280	0.707	93.247	C
24	Angle MS 25 x 3 mm(per kg)	43	2637.6	113417	0.597	93.844	C
25	Stationary Seal Ceramic 1.3/8"	424	256	108416	0.571	94.415	C
26	ss rod 316(per kg)	300	348.8	104640	0.551	94.966	C
27	ROD SS-316(per kg)	215	383.2	82388	0.434	95.399	C
28	Motor 1 HP	4821	17	81957	0.431	95.831	C
29	Sheet MS 8x4(per kg)	60	1309.5	78570	0.414	96.244	C
30	T Type Mating Ring Ceramic Size 1.375	424	160	67760	0.357	96.601	C
31	Mech Seal IM SIC V/s SIC 1.375"	3200	20	64000	0.337	96.938	C
32	Channel MS(per kg)	37	1712	63430	0.334	97.272	C
33	Bush Teflon	223	240	53544	0.282	97.553	C
34	ms plate(per kg)	75	713.25	53494	0.282	97.835	C
35	ss plate 316(per kg)	306	169	51714	0.272	98.107	C
36	MS Flats(per kg)	44	1131.8	49878	0.263	98.370	C
37	Coupling L/M 100	250	177	44250	0.233	98.603	C
38	nut	65	610	39650	0.209	98.811	C
39	Impeller SS-316/CF8M 1-5 (HRZ/VSP)	296	131	38776	0.204	99.015	C
40	Foundation Bolts(per kg)	76	500	38000	0.200	99.215	C
41	oil seal	33	831	27008	0.142	99.358	C
42	PTFE Bush 100x38x100	2590	10	25900	0.136	99.494	C
43	Lock Nut+Washer KM - 5/6	37	600	22440	0.118	99.612	C
44	Impeller Nut ST - SS	80	269	21520	0.113	99.725	C
45	Ferrul Nut Set SS-304 1/4 X 1/4" W/O Nut	36	400	14400	0.076	99.801	C
46	Brass Nut Ferul Set Elbow 3/8" x 3/8"	135	100	13500	0.071	99.872	C
47	TEFLON BUSH19 X63X100	1090	10	10900	0.057	99.929	C
48	nut m10	3	2000	6000	0.032	99.961	C
49	nut ss m12	5	1200	5400	0.028	99.989	C
50	O Ring Rubber 75x82x3.5	10	200	2000	0.011	100.000	C

For HML analysis Calculations,firstly we have arranged all the items in descending order based on their unit price. All the items whose unit price is above 10000 Rs are categorized as 'H' items, items whose unit price is between 10000 Rs and 1000 Rs are categorized as 'M' items, and items whose value is less than 1000 Rs are categorized into 'L' items, as shown in table-3 below

TABLE 3

Sr no	Item Name	Unit Price	Category	Sr no	Item Name	Unit Price	Category
1	Motor 7.5 HP	29926	H	26	T Type Mating Ring Ceramic Size 1.375	424	L
2	Motor 15 HP	28597	H	27	ss plate 316(per kg)	306	L
3	Motor 5 HP	21099	H	28	Gland Plate Hylum	303	L
4	Motor 10 HP	16852	H	29	ss rod 316(per kg)	300	L
5	Motor 3 HP	16600	H	30	Impeller SS-316/CF8M 1-5 (HRZ/VSP)	296	L
6	Motor 2 HP	13000	H	31	Pipe SS (per kg)	285	L
7	mechanical seal	5000	M	32	Coupling L/M 100	250	L
8	Motor 1 HP	4821	M	33	Bush Teflon	223	L
9	Mech Seal IM SIC V/s SIC 1.375"	3200	M	34	ROD SS-316(per kg)	215	L
10	Casing SS-316 1-5 (HRZ/VSP)	2744	M	35	Brass Nut Ferul Set Elbow 3/8" x 3/8"	135	L
11	PTFE Bush 100x38x100	2590	M	36	Impeller Nut ST - SS	80	L
12	Mech Seal IM SIC V/s Carbon + Sleeve 1 1/8"	2090	M	37	Foundation Bolts(per kg)	76	L
13	Stuffing Box SS - 316 1-7/2-6	1847	M	38	ms plate(per kg)	75	L
14	Rotary seal	1668	M	39	nut	65	L
15	AMTPP pump parts	1600	M	40	Sheet MS 8x4(per kg)	60	L
16	Base Frame MS	1590	M	41	CI casting (per kg)	55	L
17	Coupling RRL/MSS 95	1581	M	42	MS Flats(per kg)	44	L
18	Base Frame	1492	M	43	Angle MS 25 x 3 mm(per kg)	43	L
19	Stationary Seal IM (SIC) 1.375"	1265	M	44	Lock Nut+Washer KM - 5/6	37	L
20	TEFLON BUSH19 X63X100	1090	M	45	Channel MS(per kg)	37	L
21	Sleeve SS-316 (1.375")	660	L	46	Ferrul Nut Set SS-304 1/4 X 1/4" W/O Nut	36	L
22	Bearings	658	L	47	oil seal	33	L
23	ROD SS-304(per kg)	582	L	48	O Ring Rubber 75x82x3.5	10	L
24	sleeve ceramic 1.3/8"	484	L	49	nut ss m12	5	L
25	Stationary Seal Ceramic	424	L	50	nut m10	3	L

Economical order quantity and optimum numbers of orders per year for each item have been obtainedusing the formulas mentioned Research methodology and all the corresponding calculations are shown in the table-4 below.

TABLE 4

Sr no.	Item Name	Demand per year	Ordering cost/Order	Holding cost/Unit/Year	EOQ	Optimal no. of orders/Year
1	oil seal	32.5	831	200	413	2
2	sleeve ceramic 1.3/8"	484	396	250	83	5
3	Rotary seal	1668.333333	936	215	63	15
4	Sleeve SS-316 (1.375")	660	320	200	57	6
5	Casing SS-316 1-5 (HRZ/VSP)	2743.5	223	300	29	8
6	Impeller SS-316/CF8M 1-5 (HRZ/VSP)	296	131	431.5	80	2
7	Stationary Seal Ceramic 1.3/8"	423.5	256	300	78	3
8	CI casting (per kg)	55	29648.3	391	2651	11
9	AMTPP pump parts	1600	340	100	27	13
10	Coupling RRL/MSS 95	1581.25	330	200	37	9
11	Bearings	658.3333333	1129	150	93	12
12	Bush Teflon	223.1	240	63	48	5
13	Stationary Seal IM (SIC) 1.375"	1265	314	200	41	8
14	ROD SS-304(per kg)	581.86	626.95	300	104	6
15	Coupling L/M 100	250	177	50	34	5
16	Gland Plate Hylum	303.3333333	475	60	56	8
17	Mech Seal IM SIC V/s Carbon + Sleeve 1 1/8"	2090	3067	200	99	31
18	Stuffing Box SS - 316 1-7/2-6 (HRZ/VSP)	1847	300	658.5	60	5
19	Lock Nut+Washer KM - 5/6	37.4	600	366	442	1
20	Foundation Bolts(per kg)	76	500	258	238	2
21	Base Frame	1492	90	80	13	7
22	Mech Seal IM SIC V/s SIC 1.375"	3200	20	150	6	4
23	Ferrul Nut Set SS-304 1/4 X 1/4" W/O Nut	36	400	110	202	2
24	Base Frame MS	1590	359	50	19	19
25	TEFLON BUSH19 X63X100	1090	10	80	5	2
26	PTFE Bush 100x38x100	2590	10	80	3	3
27	ROD SS-316(per kg)	215	383.2	200	109	4
28	Sheet MS 8x4(per kg)	60	1309.5	80	241	5
29	Pipe SS(per kg)	285	767.45	200	134	6
30	O Ring Rubber 75x82x3.5	10	200	50	183	1
31	Brass Nut Ferul Set Elbow 3/8" x 3/8"	135	100	100	50	2
32	MS Flats(per kg)	44.07	1131.8	50	207	5
33	nut	65	610	150	217	3
34	ss rod 316(per kg)	300	348.8	150	76	5
35	ss plate 316(per kg)	306	169	150	53	3
36	msplate(per kg)	75	713.25	50	126	6
37	nut m10	3	2000	33	856	2
38	nut ss m12	4.5	1200	33	542	2
39	mechanical seal	5000	29	150	5	5
40	Motor 1 HP	4821	17	200	5	4
41	Motor 2 HP	13000	21	200	3	6

42	Motor 3 HP	16600	49	1500	12	4
43	Motor 5 HP	21099	29	1500	8	3
44	Motor 7.5 HP	29926	11	1000	4	3
45	Motor 10 HP	16852	13	1500	6	2
46	Motor 15 HP	28597	18	1500	6	3
47	T Type Mating Ring Ceramic Size 1.375	423.5	160	150	43	4
48	Impeller Nut ST - SS	80	269	100	106	3
49	Channel MS(per kg)	37.05	1712	500	878	2
50	Angle MS 25 x 3 mm(per kg)	43	2637.6	80	404	7

For obtaining the safety stock calculations we collected lead time (maximum to minimum) collected from the industry guide which varies between Ten to fifteen days. Demand is assumed to be constant, and the desired cycle service level (CSL) is assumed to be 95%, hence the Z value is 1.645. After collecting all the required parameters were obtained the desired value of safety stock for each item using the formula mentioned in Research methodology.

TABLE 5

Sr no	Item Name	Demand per year	σL	Z value	Safety Stock
1	oil seal	831	0.0309	1.645	42
2	sleeve ceramic 1.3/8"	396	0.0309	1.645	20
3	Rotary seal	936	0.0309	1.645	48
4	Sleeve SS-316 (1.375")	320	0.0309	1.645	16
5	Casing SS-316 1-5 (HRZ/VSP)	223	0.0309	1.645	11
6	Impeller SS-316/CF8M 1-5 (HRZ/VSP)	131	0.0309	1.645	7
7	Stationary Seal Ceramic 1.3/8"	256	0.0309	1.645	13
8	CI casting (per kg)	29648.3	0.0309	1.645	1507
9	AMTPP pump parts	340	0.0309	1.645	17
10	Coupling RRL/MSS 95	330	0.0309	1.645	17
11	Bearings	1129	0.0309	1.645	57
12	Bush Teflon	240	0.0309	1.645	12
13	Stationary Seal IM (SIC) 1.375"	314	0.0309	1.645	16
14	ROD SS-304(per kg)	626.95	0.0309	1.645	32
15	Coupling L/M 100	177	0.0309	1.645	9
16	Gland Plate Hylum	475	0.0309	1.645	24
17	Mech Seal IM SIC V/s Carbon + Sleeve 1 1/8"	3067	0.0309	1.645	156
18	Stuffing Box SS - 316 1-7/2-6 (HRZ/VSP)	300	0.0309	1.645	15
19	Lock Nut+Washer KM - 5/6	600	0.0309	1.645	30
20	Foundation Bolts(per kg)	500	0.0309	1.645	25
21	Base Frame	90	0.0309	1.645	5
22	Mech Seal IM SIC V/s SIC 1.375"	20	0.0309	1.645	1
23	Ferrul Nut Set SS-304 1/4 X 1/4" W/O Nut	400	0.0309	1.645	20
24	Base Frame MS	359	0.0309	1.645	18
25	TEFLON BUSH19 X63X100	10	0.0309	1.645	1
26	PTFE Bush 100x38x100	10	0.0309	1.645	1

27	ROD SS-316(per kg)	383.2	0.0309	1.645	19
28	Sheet MS 8x4(per kg)	1309.5	0.0309	1.645	67
29	Pipe SS(per kg)	767.45	0.0309	1.645	39
30	O Ring Rubber 75x82x3.5	200	0.0309	1.645	10
31	Brass Nut Ferul Set Elbow 3/8" x 3/8"	100	0.0309	1.645	5
32	MS Flats(per kg)	1131.8	0.0309	1.645	58
33	nut	610	0.0309	1.645	31
34	ss rod 316(per kg)	348.8	0.0309	1.645	18
35	ss plate 316(per kg)	169	0.0309	1.645	9
36	ms plate(per kg)	713.25	0.0309	1.645	36
37	nut m10	2000	0.0309	1.645	102
38	nut ss m12	1200	0.0309	1.645	61
39	mechanical seal	29	0.0309	1.645	1
40	Motor 1 HP	17	0.0309	1.645	1
41	Motor 2 HP	21	0.0309	1.645	1
42	Motor 3 HP	49	0.0309	1.645	2
43	Motor 5 HP	29	0.0309	1.645	1
44	Motor 7.5 HP	11	0.0309	1.645	1
45	Motor 10 HP	13	0.0309	1.645	1
46	Motor 15 HP	18	0.0309	1.645	1
47	T Type Mating Ring Ceramic Size 1.375	160	0.0309	1.645	8
48	Impeller Nut ST - SS	269	0.0309	1.645	14
49	Channel MS(per kg)	1712	0.0309	1.645	87
50	Angle MS 25 x 3 mm(per kg)	2637.6	0.0309	1.645	134

For obtaining the inventory turnover ratio we collected the annual sales data and annual inventory converted into finished product and from this collected data, we can obtain inventory turnover ratio, as shown in table-6 below.

TABLE 6

Year	Net Sales (Rs.)	Avg. Inventory (Rs.)	Ratio
2020-2021	32510814.48	25008318.83	1.30:1

V. RESULTS

According to the ABC analysis categorization results, 'A' lasses account for 17.19% of all products and account for 80% of total value utilisation every year. 'B' classes are those that account for 15.28% of total items and 10%of total value utilisation every year. And 'C' classes are those that account for 67.53% of total items and 10% of total value utilisation every year. Because the present industry has not implemented any control over the three types of commodities, it demonstrates that there is no adequate inventory management in this small-scale company. This study determines the

amount of control that should be applied on certain items.

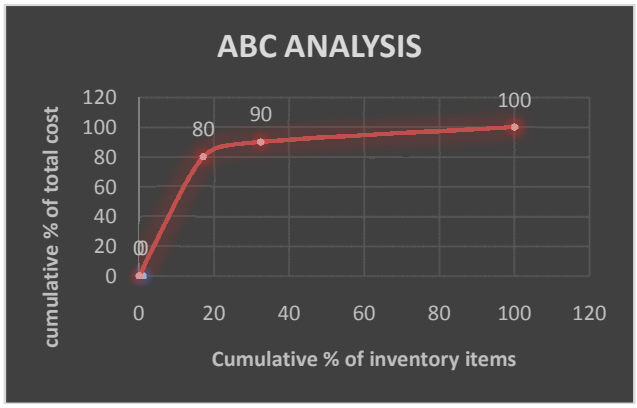

Fig 5.1 ABC Analysis Result

HML categories were done to find out items according to their unit price to give relative importance. Table shows that out of 50 items 6 items were high priced items, 14 items were medium priced items and remaining 30 items were low priced items. HML analysis will help the manager to provide relative importance of items, decide the frequency of stock checking of items, exercise control on purchase and buying polices.

TABLE 7

Category	No of items	% of items
H	6	12%
M	14	28%
L	30	60%

Apparently, no precise inventory technique model is employed in industry; raw materials are ordered based on experience or when inventory is low in the warehouse. The following cost decrease in ordering is highlighted by using the EOQ model.

TABLE 8

Normal Ordering cost per year (Rs)	Ordering cost using EOQ model (Rs)	% Reduction in ordering cost using EOQ
207667	118745	42.819%

VI. CONCLUSION

From the above study it is found that in most of the cases industry does not follow the modern inventory management system. The company selected for our research work is situated in Murbad, Maharashtra. Raw materials are ordered here based on past experience or when inventory levels in the warehouse grow depleted. They retain a two-month supply of raw materials on hand before placing an order for the following lot. As a result, the company faces the problem of overstocking or under stocking. If consumption of materials for any month is lower than the expected rate or much higher than the company has to meet the demand domestically or by rented from another company which carries a huge expense for the company. Therefore, the company needs a formalized inventory system to minimize operational costs. By doing ABC analysis & HML analysis we categorize the items and give different level of control to different items. By using safety stock calculations safe level of inventory can be maintained as per the demand. In the event that the Economic Order Quantity demonstrate is equitably utilized, with the guide of some judgment by the management, holding cost and ordering cost will turn out to be low. Inventory turnover ratio highlights the ratio of net sales and average inventory of the industry.

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