ISSN 2250-3153

Analysis of Inventory Control Techniques; A Comparative Study

Tom Jose V*, Akhilesh Jayakumar*, Sijo M T*

*SCMS School of Engineering and Technology, Kochi

Abstract- Every organization needs inventory for smooth running of its activities. It serves as a link between production and distribution processes. The investment in inventories constitutes the most significant part of current assets and working capital in most of the undertakings. Thus, it is very essential to have proper control and management of inventories. The purpose of inventory management is to ensure availability of materials in sufficient quantity as and when required and also to minimize investment in inventories. So, in order to understand the nature of inventory management of the organization, In this paper we analyzing different inventory control techniques for efficient inventory management system.

Index Terms- Assets, Distribution, Inventory, Production, Working capital

I. INTRODUCTION

So inventory control is vitally important to almost every type of business, whether product or service oriented. Inventory control touches almost every facets if operations. A proper balance must be struck to maintain proper inventory with the minimum financial impact on the customer. Inventory control is the activities that maintain stock keeping items at desired levels. In manufacturing since the focus is on physical product, inventory control focus on material control.

"Inventory" means physical stock of goods, which is kept in hands for smooth and efficient running of future affairs of an organization at the minimum cost of funds blocked in inventories. The fundamental reason for carrying inventory is that it is physically impossible and economically impractical for each stock item to arrive exactly where it is needed, exactly when it is needed.

Inventory management is the integrated functioning of an organization dealing with supply of materials and allied activities in order to achieve the maximum co-ordination and optimum expenditure on materials. Inventory control is the most important function of inventory management and it forms the nerve center in any inventory management organization. An Inventory Management System is an essential element in an organization. It is comprised of a series of processes, which provide an assessment of the organization's inventory. For example we are considering the inventories in a company which make washing machines in all these analysis.

II. ECONOMIC ORDER QUANTITY

Economic Order Quantity is the Inventory management technique for determining optimum order quantity which is the one that minimizes the total of its order and carrying costs.

In the given table the EOQ & the no. of orders purchased per year for various components are calculated. The calculated EOQ is compared with the no. of units of each component purchased in the organization. It is found that, there is a variation in the EOQ & no. of unit purchased. It is understood that the company is not following EOQ for purchasing the materials & therefore the inventory management is not satisfactory.

There are two major cost associated with inventory. Procurement cost and carrying cost. Annual procurement cost varies with the numbers of orders. This implies that the procurement cost will be high, if the item is procured frequently in small lots. The annual procurement cost is directly proportional to the quantity in stock. The inventory carrying cost decreases, if the quantity ordered per order is small. The two costs are diametrically opposite to each other. The right quantity to be ordered is one that strikes a balance between the two opposition costs. This quantity is referred to as "Economic Order Quantity"(EOQ).

$$EOQ = \sqrt{\frac{2 * \text{Demand} * \text{Re-order Cost}}{\text{Carrying Cost}}}$$

SL. NO.	COMPONENTS	**Demand Per year**	**Re-Order Cost/ order**	**Carrying Cost/unit/year**	**EOQ**	**No. of units Ordered**	**No. of order per year**
1.	Bearing - Ball Sealed – 6006	3,60,000	12,200	2	66,272.17	30,000	5.43
2.	Bearing - Ball Sealed - 6205 - Swift	48,000	6,200	2	17,251.09	4,000	2.78
3.	Drive assly - NBO - China (Agitator) - 2 pin drive	1,44,000	1,700	36	3,687.82	12,000	39.05
4.	Drive assly - ECO Dlx - NBO - China (Impeller)	96,000	1,700	36	3,011.09	8,000	31.88
5.	Driven Pulley - NBO - China (Same pulley)	2,40,000	1,700	36	4,760.95	20,000	50.41
6.	Wash timer - Eco Dlx (Ningbo) - With buzzer (S60)	30,000	1,700	2	7,141.43	2,500	4.20
7.	Wash timer - Eco Dlx (Ningbo) - Without buzzer (SI 60)	42,000	1,700	2	8,449.85	3,500	4.97
8.	Heater (WW)	21,600	4,700	2	10,075.71	1,800	2.14
9.	Heater (Chandini)	9,600	6,200	2	7,714.92	800	1.24
10.	Pig tail connector-3.0	3,60,000	6,200	2	47,244.05	30,000	7.62
11.	Pig tail connector-3.8	1,80,000	6,200	2	33,406.59	15,000	5.39
12.	Seal drive tube - Swift	42,000	6,200	2	16,136.91	3,500	2.60
13.	Seal tub support - Swift	42,000	6,200	2	16,136.91	3,500	2.60
14.	WW Motor - Welling	90,000	6,200	18	7,874.01	7,500	11.43
15.	Splash Motor	42,000	6,200	18	5,378.97	3,500	7.81
16.	Motor - Jeamo	3,00,000	65,200	18	46,619.02	25,000	6.44
17.	Clamp tub	66,600	10,100	2	25,935.69	5,550	2.57
18.	Suspension Spring Assly FLT 70 (Fimstud)	7,200	10,000	2	8,485.28	600	0.85
19.	Door Lock - High End	1,800	15,400	2	5,264.98	150	0.34
20.	Door Lock, Low End, FLT70	1,800	15,400	2	5,264.98	150	0.34
21.	Ball Bearing-Outer, FLT70	3,600	8,400	2	5,499.09	300	0.65
22.	Ball Bearing-Inner, FLT70	3,600	8,400	2	5,499.09	300	0.65
23.	Heating Element , High/Mid End,FLT70	1,800	8,400	2	3,888.44	150	0.46
24.	Heater Low end	1,800	8,400	2	3,888.44	150	0.46
25.	Pressostat, FLT70	3,600	8,400	2	5,499.09	300	0.65
26.	Timer T2-EC6018-FLT	1,800	8,900	2	4,002.50	150	0.45

27.	Water Distribution Actuator, FLT70	1,800	7,900	2	3,770.94	150	0.48
28.	Nut Push In, FLT70	21,600	16,400	2	18,821.26	1,800	1.15
29.	Heater Clip,FLT70	3,600	7,750	2	5,282.05	300	0.68
30.	Bellow, FLT70	3,600	84,300	2	17,420.68	300	0.21
31.	Shock Absorber Assy, FLT70	7,200	9,800	2	8,400.00	600	0.86
32.	Universal Motor Assy, Mid&High End,FLT70	1,800	49,200	18	3,136.88	150	0.57
33.	Motor Low end	1,800	57,200	18	3,382.31	150	0.53
34.	Window Glass,FLT70	3,600	23,100	18	3,039.74	300	1.18
35.	Drain Pump, FLT	1,800	20,100	2	6,014.98	150	0.30
36.	On / Off Switch Low end (Push button switch)	1,800	7,700	2	3,722.90	150	0.48
37.	Thermostat Variable, Low End, FLT70	1,800	8,500	2	3,911.52	150	0.46
38.	Poly V Belt,FLT70	1,800	1,700	2	1,749.29	150	1.03
39.	Tub Sealing, FLT70	3,600	1,700	2	2,473.86	300	1.46
40.	SS Coil	2,40,000	52,200	18	37,309.52	20,000	6.43

(Table- I)

III. SAFETY STOCKS

Safety stocks are the minimum additional inventories which serve as a safety margin to meet an unanticipated increase in usage resulting from an unusually high demand and an uncontrollable late receipt of incoming inventory.

In the given table, safety stocks for the various components calculated are shown. Actual demand is given for each component for a period of 1 year and the lead-time is calculated at a maximum of 100 days & normal of 60 days and these were converted into per annum. So, from calculation of safety stock, we can able to determine how much the company can hold the inventory in reserve stock per annum.

Sl. No.	Components	Max. Lead Time	Normal Lead Time	Demand	Safety Stock
1.	Bearing - Ball Sealed – 6006	0.27	0.166	3,60,000	37,440
2.	Bearing - Ball Sealed - 6205 – Swift	0.27	0.166	48,000	4,992
3.	Drive assly - NBO - China (Agitator) - 2 pin drive	0.27	0.166	1,44,000	14,976
4.	Drive assly - ECO Dlx - NBO - China (Impeller)	0.27	0.166	96,000	9,984
5.	Driven Pulley - NBO - China (Same pulley)	0.27	0.166	2,40,000	24,960
6.	Wash timer - Eco Dlx (Ningbo) - With buzzer (S60)	0.27	0.166	30,000	3,120
7.	Wash timer - Eco Dlx (Ningbo) - Without buzzer (Sl 60)	0.27	0.166	42,000	4,368
8.	Heater (WW)	0.27	0.166	21,600	2,246.4
9.	Heater (Chandini)	0.27	0.166	9,600	998.4
10.	Pig tail connector-3.0	0.27	0.166	3,60,000	37,440

11.	Pig tail connector-3.8	0.27	0.166	1,80,000	18,720
12.	Seal drive tube – Swift	0.27	0.166	42,000	4,368
13.	Seal tub support – Swift	0.27	0.166	42,000	4,368
14.	WW Motor – Welling	0.27	0.166	90,000	9,360
15.	Splash Motor	0.27	0.166	42,000	4,368
16.	Motor - Jeamo	0.27	0.166	3,00,000	31,200
17.	Clamp tub	0.27	0.166	66,600	6,926.4
18.	Suspension Spring Assly FLT 70 (Fimstud)	0.27	0.166	7,200	748.8
19.	Door Lock - High End	0.27	0.166	1,800	187.2
20.	Door Lock, Low End, FLT70	0.27	0.166	1,800	187.2
21.	Ball Bearing-Outer, FLT70	0.27	0.166	3,600	374.4
22.	Ball Bearing-Inner, FLT70	0.27	0.166	3,600	374.4
23.	Heating Element , High/Mid End,FLT70	0.27	0.166	1,800	187.2
24.	Heater Low end	0.27	0.166	1,800	187.2
25.	Pressostat, FLT70	0.27	0.166	3,600	374.4
26.	Timer T2-EC6018-FLT	0.27	0.166	1,800	187.2
27.	Water Distribution Actuator, FLT70	0.27	0.166	1,800	187.2
28.	Nut Push In, FLT70	0.27	0.166	21,600	2,246.4
29.	Heater Clip,FLT70	0.27	0.166	3,600	374.4
30.	Bellow, FLT70	0.27	0.166	3,600	374.4
31.	Shock Absorber Assy, FLT70	0.27	0.166	7,200	748.8
32.	Universal Motor Assy, Mid & High End,FLT70	0.27	0.166	1,800	187.2
33.	Motor Low end	0.27	0.166	1,800	187.2
34.	Window Glass,FLT70	0.27	0.166	3,600	374.4
35.	Drain Pump, FLT	0.27	0.166	1,800	187.2
36.	On / Off Switch Low end (Push button switch)	0.27	0.166	1,800	187.2
37.	Thermostat Variable, Low End, FLT70	0.27	0.166	1,800	187.2
38.	Poly V Belt,FLT70	0.27	0.166	1,800	187.2
39.	Tub Sealing, FLT70	0.27	0.166	3,600	374.4
40.	SS Coil	0.27	0.166	2,40,000	24,960

(Table II)

IV. ABC ANALYSIS

The ABC system is a widely used classification technique to identify various items of inventory for purposes of inventory control. On the basis of unit cost involved, the various items are classified into 3 categories:

(1) A, consisting of items with the large investment,
(2) C, with relatively small investments but fairly large number of items and
(3) B, which stands mid-way between category A & C.

Category A needs the most rigorous control, C requires minimum attention and B deserves less attention than A but more than C.

➢ A Class (High Value)
- Drive assly - NBO - China (Agitator) - 2 pin drive
- Drive assly - ECO Dlx - NBO - China (Impeller)
- Wash timer - Eco Dlx (Ningbo) - With buzzer (S60)
- Heater (WW)
- Heater (Chandini)
- WW Motor - Welling
- Splash Motor
- Motor - Jeamo
- Heating Element, High/Mid End,FLT70
- Heater Low end
- Timer T2-EC6018-FLT
- Water Distribution Actuator, FLT70
- Bellow, FLT70
- Thermostat Variable, Low End, FLT70
- Universal Motor Assy, Mid & High End,FLT70
- Motor Low end
- Window Glass,FLT70
- Drain Pump, FLT

➢ B Class (Moderate Value)
- Bearing - Ball Sealed - 6006
- Bearing - Ball Sealed - 6205 - Swift
- Wash timer - Eco Dlx (Ningbo)
- Door Lock - High End
- Door Lock, Low End, FLT70
- Ball Bearing-Outer, FLT70
- Ball Bearing-Inner, FLT70
- Seal drive tube - Swift
- Seal tub support - Swift
- Pressostat, FLT70
- Shock Absorber Assy, FLT70
- On / Off Switch Low end (Push button switch)
- SS Coil
- Poly V Belt,FLT70

➢ C Class (Low Value)
- Driven Pulley - NBO - China (Same pulley)
- Pig tail connector-3.0
- Pig tail connector-3.8
- Clamp tub
- Suspension Spring Assly FLT 70 (Fimstud)
- Nut Push In, FLT70
- Heater Clip,FLT70
- Tub Sealing, FLT70

CATEGORIES	Total No. Items in Classes	Percentage
A	18	45
B	14	35
C	8	20

(Table-III)

V. FSN ANALYSIS

All the items in the inventory are not required at the same frequency. Some are required regularly, some occasionally and some very rarely. FSN classifies items into Fast moving, Slow moving and Non-moving.

➢ Fast moving items
- Bearing - Ball Sealed - 6006
- Bearing - Ball Sealed - 6205 - Swift
- Drive assly - NBO - China (Agitator) - 2 pin drive
- Drive assly - ECO Dlx - NBO - China (Impeller)
- Driven Pulley - NBO - China (Same pulley)
- Wash timer - Eco Dlx (Ningbo) - With buzzer (S60)
- Wash timer - Eco Dlx (Ningbo)
- Heater (WW)
- Heater (Chandini)
- Pig tail connector-3.0
- Pig tail connector-3.8
- Seal drive tube - Swift
- Seal tub support - Swift
- WW Motor - Welling
- Splash Motor
- Motor - Jeamo
- SS Coil

➢ SLOW MOVING ITEMS
- Clamp tub
- Suspension Spring Assly FLT 70 (Fimstud)
- Door Lock - High End
- Door Lock, Low End, FLT70
- Ball Bearing-Outer, FLT70
- Ball Bearing-Inner, FLT70
- Heating Element , High/Mid End,FLT70
- Heater Low end
- Pressostat, FLT70
- Timer T2-EC6018-FLT
- Water Distribution Actuator, FLT70
- Nut Push In, FLT70
- Heater Clip,FLT70
- Bellow, FLT70
- Shock Absorber Assy, FLT70
- Universal Motor Assy, Mid & High End,FLT70
- Motor Low end
- Window Glass,FLT70
- Drain Pump, FLT
- On / Off Switch Low end (Push button switch)
- Thermostat Variable, Low End, FLT70
- Poly V Belt,FLT70
- Tub Sealing, FLT7023 17

Categories	Total No. items in Classes	Percentage
F	17	43
S	23	57
N	0	0
TOTAL	40	100

(Table-IV)

In the above table shows the classification of various components as FSN items using FSN analysis techniques based on movements. From the classification F items are those which moves fastly and constitutes 43% of total components. S items are those which moves slowly constitute 57% of total components and N items are those which don't move (Non-moving items). According to data given, there are no Non-moving items. It is not good as the company maintains low percentage in moving items.

VI. RESULTS AND DISCUSSIONS

It is found that, there is a variation in the EOQ & no. of unit purchased. It is understood that the company is not following EOQ for purchasing the materials. So, the inventory management is not satisfactory. From calculation of safety stock, we can able to determine how much the company can hold the inventory in reserve stock per annum

From the classification A classes are those whose unit value is more than Rs.100 and constitutes 45% of total components. B classes are those whose unit value is between Rs.25-100 constitutes 35% of total components and C classes are those whose unit value is less than Rs.25 constitutes 30% of total components. It is good that the company maintains its inventories based on its value using controlling techniques. From the classification F items are those which moves fastly and constitutes 43% of total components. S items are those which moves slowly constitute 57% of total components and N items are those which don't move (Non-moving items). According to data given, there are no Non-moving items. It is not good as the company maintains low percentage in fast moving items in compared to slow moving inventories based on movements using controlling techniques.

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AUTHORS

Mr. Tom Jose V - B.tech (Mechanical Engineering), M.tech (Production and Industrial Engineering). SCMS School of Engineering and Technology, Kochi. Email: tomjosev@gmail.com.

Mr. Akhilesh Jayakumar - B.tech (Mechanical Engineering), M.tech (Production and Industrial Engineering). SCMS School of Engineering and Technology, Kochi. Email: akhileshjkl@gmail.com.

Asst Prof. Sijo M T - B.tech (Mechanical Engineering), M.tech (Production). SCMS School of Engineering and Technology, Kochi.