Implementation of inventory management tools to increase productivity of Panjtan Packaging

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Abstract— Inventory is defined as the quantity or value of the current stock of a manufacturer or retailer. This can include raw materials and parts which will be used later in manufacturing process. It is vital for controlling goods and materials that have use in production or exchange activities in services. Inventory problems of carrying too small or too great quantities in hand can result in business failure production stops if stock out of a critical inventory item is experienced by the manufacturer. Hence it is important to establish an appropriate inventory control system or to enhance the existing system. Because the organization encounters inventory related costs like handling cost, ordering cost, shortage cost, the increase in any one due to lack of control has negative effects on the profit of organization. The ultimate aim of the research is to study the inventory and demand patterns of a small scale industry, Panjtan Packaging, which deals with the manufacturing of paper bags and suggest optimum inventory level by implementation of inventory management techniques like ABC analysis and EOQ model. This study finds an optimal ordering quantity and systematic categorization of raw material which in turn will help to reduce the losses associated with improper inventory handling.

Keywords- *Inventory, Inventory Management, Stock outs, EOQ Model, ABC Analysis.*

I. Introduction

Inventory is defined as the quantity or value of the current stock of a manufacturer or retailer. This can include raw materials and parts which will be used later in manufacturing process. The managing of inventory is vital for smooth running of a business. Inventory management is important for effective organization. It is vital for controlling goods and materials that have use in production or exchange activities in services. The goal of managing inventory is to abstain holding too much stock. Inventory problems of carrying too small or too great quantities in hand can result in business failure production stops if stock out of a critical inventory item is experienced by the manufacturer. However the retailer may lose a customer if an item is not stocked when the customer thinks it should be. Effective inventory management makes significant contribution in company's profit along with increasing its return on assets. Management of inventory involves comparison between costs associated with holding inventory versus benefits of keeping inventory. Eleonora Kontus [1] in her study of inventory management has stated it as extremely important function within most businesses. The optimal administration of company's inventory is a crucial problem and its solution can have a direct impact on efficiency of business enterprise. A quality inventory level should be based totally on consideration of profitability resulting from multiplied merchandise with the possibility cost of carrying higher inventory balances. Talatu Muhammad Barwa [2] in his study carried out research and analyzed factors involved in control of inventory and its implementation in growth of company. The reviewed literature and its analysis concludes that even though the right sizing and effective management and control of inventory is a challenging and complex task but the increasing pressure placed by top management to reduce cost and improve customer satisfaction, inventory managers are moving towards adopting and implementing advanced inventory management system. .Dr.G.Brindha [3] states that the control of inventory is a common problem to organizations in any sector of economy. The wealth of shareholders also lies in the warehouse. More than 60% of working capital is normally being invested in the inventory. There can be disadvantages in holding either too much or too little inventory. Therefore inventory management is primarily concerned with obtaining correct balance between two extremes. Komal Nain Sukhia [4] suggested that the work involves the development of point of sale application with the basic features of managing customers, employees, products, categories, brands, suppliers etc. Moreover it focuses on inventory management and inventory control by using demand forecasting techniques of moving average, linear regression and back propagation. Application of Economic Order Quantity model for reducing the costs related to inventory. It also analyzes the sales data of customers to determine which

products must be shelved together to increase sales. Dr. Rakesh Kumar [5] states in his study that inventories are any firms primary asset and they represent an investment. As such investments needs a commitment of funds, hence inventories should be maintained at correct level. The EOQ model calculates the optimum quantity that needs to be purchased in order to reduce the holding and ordering cost.

Sunil Yadav [6] says in his paper that although all organization maintains different types of inventories, it loose effective management of inventory. Hence it is important to establish an appropriate inventory control system or to enhance the existing system. Because the organization encounters inventory related costs like handling cost, ordering cost, shortage cost, the increase in any one due to lack of control has negative effects on the profit of organization. This paper aims in improving inventory management methods of a small scale industry-PANJTAN PACKAGING, which deals in manufacturing of paper bags. As a small scale industry they don't focus on proper inventory management which in turn leads to frequent stock outs and over stocking of raw material which eventually results in loss of company. The ultimate aim of the research is to study their inventory and demand patterns and suggest optimum inventory level by implementation of inventory management techniques like ABC analysis and EOQ model. This study finds an optimal ordering quantity and systematic categorization of raw material.

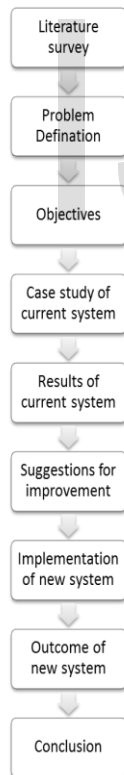The overall methodology is shown in Fig.1.

Fig. 1. Overall methodology

II. DATA COLLECTION & TYPES OF DATA

The bags are categorized in three main types based on their holding capacity in kgs. The sizes available are of ½ kg, 2kg, and 5kg. The unit weight of each roll for above mentioned sizes are 130kg, 250kg, and 400 kg respectively. Similarly number of rolls required to fulfill the demand are 40 nos, 32 nos, and 26 nos respectively. The unit cost of roll of 130 kg is 4000 rs, roll of 250 kg is of 7000 rs and roll of 450 kg is of 9000 rs. The primary data collected shows that the demand of half kg bag is more averaging up to 250000 bags per month while the demand of 2 kg bag is moderate up to 200000 per month and 5 kg bags has a least demand of 153000 units per month. The ordering pattern is of four order of 6 ton each per month, while the transport vehicle capacity is 10 tons and hence the remaining load is being shared with other vendors which ultimately increases transport cost. The demand pattern of six months is illustrated with the help of the graph below.
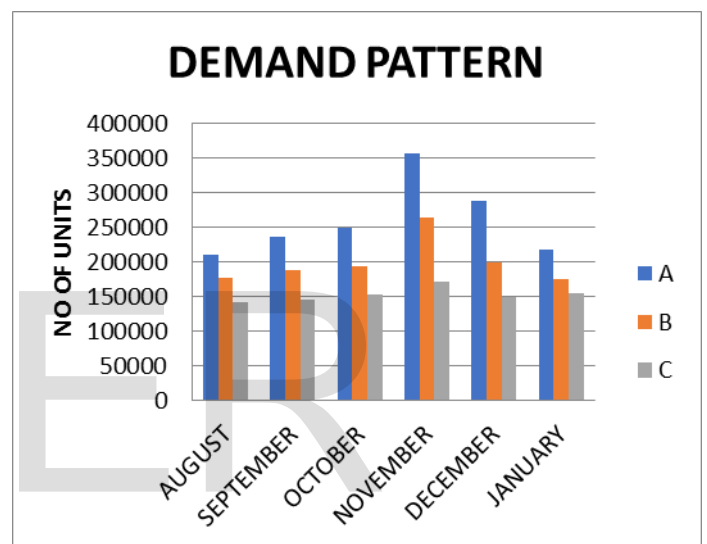

Fig. 2. DEMAND PATTERN

Product	A	B	C
Sizes available	1/2	2	5
Average demand (nos)	250000	200000	153000
Unit weight of roll (kg)	130	250	450
No of rolls required (nos)	40	32	26
Cost per roll (rs)	4000	7000	9000

TABLE 1: RAW DATA AVAILABLE

The production is carried out in batches of 10 kgs each and no of bags produced in each case is given below.

½ kg bag	2 kg bag	5 kg bag
500 nos	250 nos	150 nos

TABLE 2: BATCH DETAILS

III. EOQ MODEL & ABC ANALYSIS

EOQ model focuses on finding the optimum ordering quantity which will reduce the overall inventory cost. EOQ model balances the ordering and holding cost of the raw material. The calculation of Economic order quantity requires the input like demand, holding cost of material, ordering cost of material etc. The formula of EOQ is given below

$$EOQ = \sqrt{\frac{2DCO}{CH}}$$

where D stands for demand, Co stands for ordering cost, Ch stands for holding cost.

The implementation of EOQ model in Panjtan packaging industry's inventory yielded the following results

Product	D	Co	C_h	Q	Q*
A	40	1500	300	10	20
B	32	2000	500	8	16
C	26	2500	800	7	13

Where, Q was the earlier ordering quantity and Q* is economic order quantity.

IV. RESULTS AND CONCLUSIONS

This work dealt with the optimization of inventory Panjtan packaging in order to minimize the inventory handling cost. Before implementation of EOQ model the company required 4 orders of small quantity per month to meet their demand, this resulted in increased ordering cost though the handling cost was comparatively less. After implementation of EOQ model it was found that ordering economic order quantity resulted in decrease in number of orders per month by 50% which ultimately reduced the inventory cost. Earlier the inventory cost was Rs. 6,48,000/- per month. Ordering at EOQ reduced the inventory cost to Rs. 5,70,000/- per month. It was found that just by implementing EOQ model the total annual savings were RS.78,000/-.

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