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Analysis of Inventory Control Management

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ABSTRACT:

Inventory management is maintaining your inventory levels to ensure that you have an adequate supply of each product. Effective inventory management may help you keep track of your purchase orders and maintain a successful supply chain. Systems may be set up to assist with forecasting and to enable you to define reorder points.Grocery shops and other companies that sell perishable commodities are examples of inventory control. Grocery businesses work hard to guarantee that fresh food is accessible when consumers want it, but not so much that it spoils on the shelf. Inventory management techniques guarantee that high-demand items are easily accessible while low-demand products are maintained in reduced quantity in a warehouse firm where perishable commodities are not a concern.

KEYWORDS:

Analysis, Economic, Forecasting, Inventory Control, Quantity Eoq.

I. INTRODUCTION

In most cases, inventory refers to the supplies on hand. It is also known as an enterprise's idle resource. Inventories are things that are either stored for sale, in the process of being manufactured, or in the form of materials that have yet to be used. The period between acquiring bought components and changing them into finished goods varies by industry and depends on the manufacturing cycle time. For the system to operate well, multiple types of inventories must be held to function as a buffer between supply and demand. Hence, good inventory management is essential for the smooth and efficient operation of the production cycle with the fewest disruptions[1], [2].To stabilise production: The demand for an item changes due to a variety of reasons, such as seasonality, manufacturing schedule, and so on. The inventories raw materials and components should be made accessible to production as demand dictates, failing which leads in stock out and a production halt due to a lack of supplies. As a result, inventory is retained to account for this volatility and ensure that production runs smoothly.

To take advantage of price savings: Often, manufacturers give discounts for bulk purchases, and in order to take advantage of this price advantage, supplies are purchased in bulk even if they are not needed immediately. Consequently, inventory is kept in order to save money on purchases. To satisfy demand during the replenishment period. The lead time for material procurement is determined by a variety of variables such as the location of the source, demand supply conditions, and so on.As a result, inventory is kept on hand to fulfil demand during the procurement replenishment phase.To avoid losing orders sales: In this competitive environment, one must fulfil delivery schedules at 100% service level, which means they cannot afford to miss the delivery schedule, which may result in lost sales. Organizations must keep inventories in order to prevent this.To keep up with changing market circumstances, firms must anticipate shifting market emotions and stock supplies in anticipation of supply shortages or price increases.Organizations are often forced to hold commodities owing to other factors such as supplier minimum quantity requirements, seasonal availability of materials, or unexpected price increases.

Meaning of Inventory Control

Inventory management is a planned technique to selecting what to get, when to order, how much to order, and how much to store so that expenses associated with purchasing and storage are minimised while production and sales are not disrupted. Inventory control primarily addresses two issues: I When should an order be placed? Order level, as well as ii how much should be ordered? Place your order.Inventory models are used to address these problems. The scientific inventory management system establishes a balance between the loss caused by an item's nonavailability and the expense of carrying an item's stock. Scientific inventory management seeks to maintain an optimal amount of stock of items needed by the firm at the lowest possible cost to the company.

Objectives of Inventory Control

1. To guarantee enough product supply to customers and to minimise shortages as much as feasible.
2. To ensure that the financial investment in inventory is kept to a minimal i.e., that working capital is restricted to the greatest degree practicable.
3. Effective material purchase, storage, consumption, and accounting is a critical goal.
4. To keep a timely record of all inventory items and to keep the stock within the required limits.
5. Ensure timely replenishment activity.
6. Have a reserve stock to account for fluctuations in material supply lead times.
7. To offer a scientific foundation for both shortterm and longterm material planning.

Benefits of Inventory Control

It is a wellknown fact that the following advantages of inventory management may be obtained via the practise of scientific inventory control:

1. Improved customer relationships as a result of timely delivery of products and services.
2. Consistent and continuous manufacturing, resulting in no stock out.
3. Effective use of operating capital. Reduces loss due to degradation, obsolescence damage, and pilferage.
4. Purchasing economy.
5. Removes the option of ordering twice.

Techniques of Inventory Control

Inventory is kept in each company, regardless of the sort of business. When there are a big number of things in inventory and a considerable amount of money is required to build such inventory, it becomes the responsibility of management to have adequate control over its ordering, procurement, maintenance, and consumption. Order quality and order frequency may be controlled.The following inventory control methods are available:

1. ABC analysis.

2. HML analysis.

3. VED analysis.

4. FSN analysis.

5. SDE analysis.

6. GOLF analysis.

7. SOS analysis.

ABC analysis is the most extensively used inventory control approach. The complete inventory is divided into three subheads in this approach, and then correct exercise is performed for each subhead.

1. ABC Breakdown: The categorization of existing inventory in this research is based on yearly consumption and the annual value of the products. As a result, we calculate the yearly consumption cost by taking the number of inventory items utilised over the year and multiplying it by the unit cost. After that, the goods are ordered in decreasing order of yearly consumption cost. The study is carried out by creating a graph based on the total number of products and total consumption cost. The following is how classification is done:After achieving ABC categorization, the policy control may be written as follows:

AItem: Very strict control due to the high worth of the goods. The authority must be exerted at a higher level.

BItem: Moderate control, with moderately valuable objects. Control must be applied at the intermediate level of authority.

CItem: Since the items are of little value, control may be conducted at the highest level of authority, i.e., by the relevant user department managers.

2. HML Analysis: In this analysis, existing inventory is classified based on the unit price of the products. They are divided into three price ranges: high, medium, and inexpensive.

3. VED Analysis: In this study, existing inventory is classified based on its criticality. They are divided into three categories: vital, necessary, and desired. It is mostly used in spare parts inventories.

4. FSN Analysis: The categorization of existing inventory is based on consumption of the products in this study. They are divided into three categories: rapid moving, slow moving, and nonmoving.

5. SDE Analysis: The categorization of existing inventory is based on the items in this analysis.

6. GOLF Analysis: The categorization of existing inventory is dependent on the sources of the items in this analysis. They are divided into four categories: government supply, commonly accessible, locally available, and foreign source of supply.

7. SOS Analysis: In this analysis, existing inventory is classified depending on the type of the supply of commodities. They are divided into two categories: seasonal and offseasonal products.

Practically, the combination of ABC with VED or ABC with HML or VED with HML analytical methodologies is employed for successful inventory control[3].

II. DISCUSSION

Economic Order Quantity Eoq

Inventory models are concerned with idle resources such as personnel, machinery, money, and materials. These models are concerned with two decisions: how much to order buy or make and when to order in order to minimise overall costs.When deciding how much to purchase, two main expenses are considered: inventory carrying costs and ordering or acquisition costs. The inventory carrying cost rises as the amount ordered rises, but the ordering cost falls. The amount produced or obtained during one manufacturing cycle is referred to as the order quantity. By balancing the two costs, the economic order quantity is determined. Economic Order Quantity EOQ is the order size that minimises overall carrying and ordering expenses.

Minimal Total Cost is achieved when Inventory Carrying Cost = Ordering Cost.

1. There are two approaches for determining economic order quantity:
2. The technique of tabulation.
3. Algebraic approach.

The following stages are included in this method:

1. Determine the number of feasible lot sizes to buy.

2. Determine the lot's average inventory carrying cost.
3. Calculate the total cost of the orders ordered.
4. Calculate the total cost for each lot size selected, which is the sum of the inventory carrying cost and the ordering cost.
5. Determine the ordering quantity that will result in the lowest overall cost.

Determination of EOQ by Analytical Method

1. The demand is predictable and consistent.
2. Denote the total number of units purchased/produced by D and the lot size in each manufacturing run by Q.
3. Shortages are not tolerated; thus, as soon as the inventory level approaches zero, the inventory is refilled.
4. Commodity production or supply is immediate.
5. There is no lead time.
6. C3 is the setup cost per manufacturing run or procurement cost.
7. Inventory carrying cost is defined as C1 = CI, where C is the unit cost and I is the inventory carrying cost represented as a percentage of the average inventory value.
8. This basic condition may be shown using an inventorytime diagram with Q on the vertical axis and time on the horizontal. The whole time span one year is split into n segments.

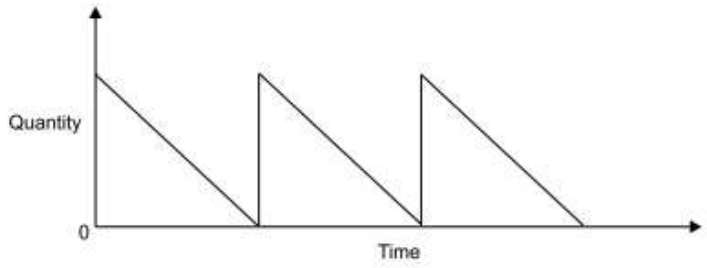

Figure 1: Represent the Inventory carrying [Diva. Portal.Org].

Value Analysis

During World War II, Lawrence D. Miles was credited for creating and calling the approach value engineering or value analysis. Value analysis is described as an structured creative method with the goal of identifying unneeded costcosts that give neither quality nor usage nor life nor appearance nor consumer attributes (Figure.1).Value analysis directs engineering, production, and buying efforts towards a single goal: equal performance at a lower cost. The expenditures incurred as a result of inefficient or unneeded requirements and features are the focus of value analysis. It contributes in the last step of the product cycle, namely the maturity stage.At this point, research and development no longer offer beneficial contributions in terms of enhancing the efficiency of the product's functions or adding new ones to it. Value is not inherent in a thing; it is a relative phrase that varies with time and location. It can only be measured by comparing it to other goods that fulfil the same job. The link between what someone wants and what he is prepared to pay for it is defined as value. The functional approach is, in fact, at the core of the value analysis process. It refers to the cost of the function, while others refer to the cost of the output[4]–[6].

Ergonomics Human Engineering

The term 'ergonomics' derives from the Greek terms ergon, which means law, and omics, which means economy. As a result, it is the study of man in relation to his job. It is known as human engineering or human factors engineering in the United States and other countries. Human engineering is defined by the International Labour Organization as the use of human biological sciences in conjunction with engineering sciences to achieve optimal mutual adjustment of men and their work, the advantages being assessed in terms of human efficiency and wellbeing.Human factors, often known as human

engineering, are concerned with manmachine systems. Another description that emphasises the manmachine system is the design of human jobs, manmachine systems, and successful work completion, including displays for displaying information to humans sensors, controls for human operations, and complicated manmachine systems.Human engineering is concerned with people and their interactions with goods, equipment, facilities, and work environments. Human engineering aims to improve the items people use and the environment in which they use them in order to better fit people's talents, limits, and needs.

Objectives of Human Engineering

Human engineering ergonomics has two overarching goals:

1. To improve the efficiency and effectiveness with which actions work are carried out in order to improve user convenience, eliminate mistakes, and boost productivity.
2. To promote some desired human qualities such as safety, stress reduction, and overall quality of life.

Hence, the scope and goal of ergonomics in general is designing for human usage and optimising working and living situations. Human factors ergonomics are hence the discovery and use of knowledge regarding human behaviour. The use of abilities and limits, as well as other qualities, to the design of tools, machines, systems, tasks, jobs, and environments for productive, safe, pleasant, and successful human usage. Ergonomics strives to provide comfort and better working circumstances in order to channel employees' energy and talents into constructive productive labour. This accounts for better productivity, safety, and fatigue reduction. This contributes to increased plant use.

JustInTimeJit Manufacturing

JIT Manufacturing is more of a concept than a technology. It strives to create a production system that responds to market demands by eliminating all waste and pursuing continual improvement.Since this system runs with little WIP WorkInProcess inventory as well as frequently with extremely low completed products inventory, the phase just in time is employed. Items are assembled before to sale, subassemblies are created prior to assembly, and components are created and produced prior to subassemblies. This results in lesser WIP and shorter lead times. To accomplish this, firms must thrive in other areas, such as quality.According to Voss, JIT is a production process that strives to enhance overall productivity via waste removal and leads to better quality.JIT enables effective manufacturing in an organisation and the delivery of just the essential components in the correct amount, at the right time, and at the right location while using the fewest facilities [7], [8].

Seven Wastes

Shiego Shingo, a Toyota Motor Corporation engineer and Japanese JIT expert, proposes seven wastes as the focus of continuous improvement in the manufacturing process. The improvement is gained by addressing these wastes[9]–[11].

III. CONCLUSION

Businesses may minimise stockouts, lower carrying costs, avoid overstocking, enhance customer service, and optimise cash flow by managing their inventory well. Companies can quickly satisfy consumer requests with the help of an effective inventory control and management system, which also helps them avoid the expenses and capital constraints that come with having too much inventory on hand.Eliminate waste of overproduction by minimising setup times, coordinating quantities and timing across operations, and resolving layout issues. Create just what is required right now.Eliminate bottlenecks and balance unequal loads by using a flexible workforce and equipment.

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