CHAPTER –I

AN INTRODUCTION

1.1 Background of the Study

During these days with the introduction of globalization, many industries have established both in private and government sectors. Every industry is established with a view to earn profit from their product either goods or services. The industry, which produces product such as pasteurized milk, cream, butter, ghee, yoghurt, sweet, noodles etc. are called manufacturing industries and the industry that produce service such as Hotel, consultancy etc. are called service industry. For both types of industries inventory management' plays a vital role to achieve their goal of profit maximization through the efficient management of both inputs and output as well.

In an agricultural country like Nepal effective mobilization of the agricultural resources is very necessary. In modern age, for economic development subsection of the economy identifying in agriculture area. For example: Fishing, bee keeping, grain production, field crops, livestock and forestry. One of these milk productions is one of the helpful businesses. Being a agricultural country, Nepal has to give importance to milk production. So that, production of milk should given more attention from the side of farmer and from the side of government. It has to manage properly. Similarly traditionally it was integrated with agriculture as a source of income but has not been developed as an occupation by itself.

Inventory is store of goods and stocks. Inventory is one of the most important assets to many organizations. Large percentage of the total capital is invested in inventory. Inventory is vital element of the firm that serves, as determinant to achieve desired sales level.

Inventory management involves planning of the optimal level of inventory and control of inventory cost supported by an appropriate organization structure, which is staffed by trained persons and directed by top management.

Management of inventory plays a vital role in any Organization whether it is manufacturing or trading. Any organization would like to keep some stock of goods keeping in mind tomorrow's sales. The nature and size of stock depends upon the transaction of organization. Inventories are the stock of raw materials , semi finished goods as well as supplies. "Inventory enlists the names quantities and monetary values of all or any group of items" (Goeal B.S) modern concept of inventory management can be traced to (1915-1922) when several authors (R.C. Davis, H.S. Owen, E.F. Clark and R.N. Wilson) acting independently developed economic lot size equation with minimized the sum of carrying and ordering cost for where the demand was known and supposed to be constant. According to the inventory management there are 4 components – Raw material, Work-in-process, finished stock and supplies.

The size of inventory differs from organization to organization of the transition of the organization is small and limited, the level and variety of inventory will be low and vice versa. Higher level of inventory increase the carrying cost and lower level of inventory would abstract in

supply of inventory at desired amount at the right time. Inventory management is an integral part of cost accounting, financial management and profit planning and control. Hence inventory management plays a very significant role in any enterprise.

Finally it can be concluded that inventory management is the base of manufacturing organization. So I will analyze how inventory management affects the production and sales of an organization and also the relationship and efficiency of utilization in this research work.

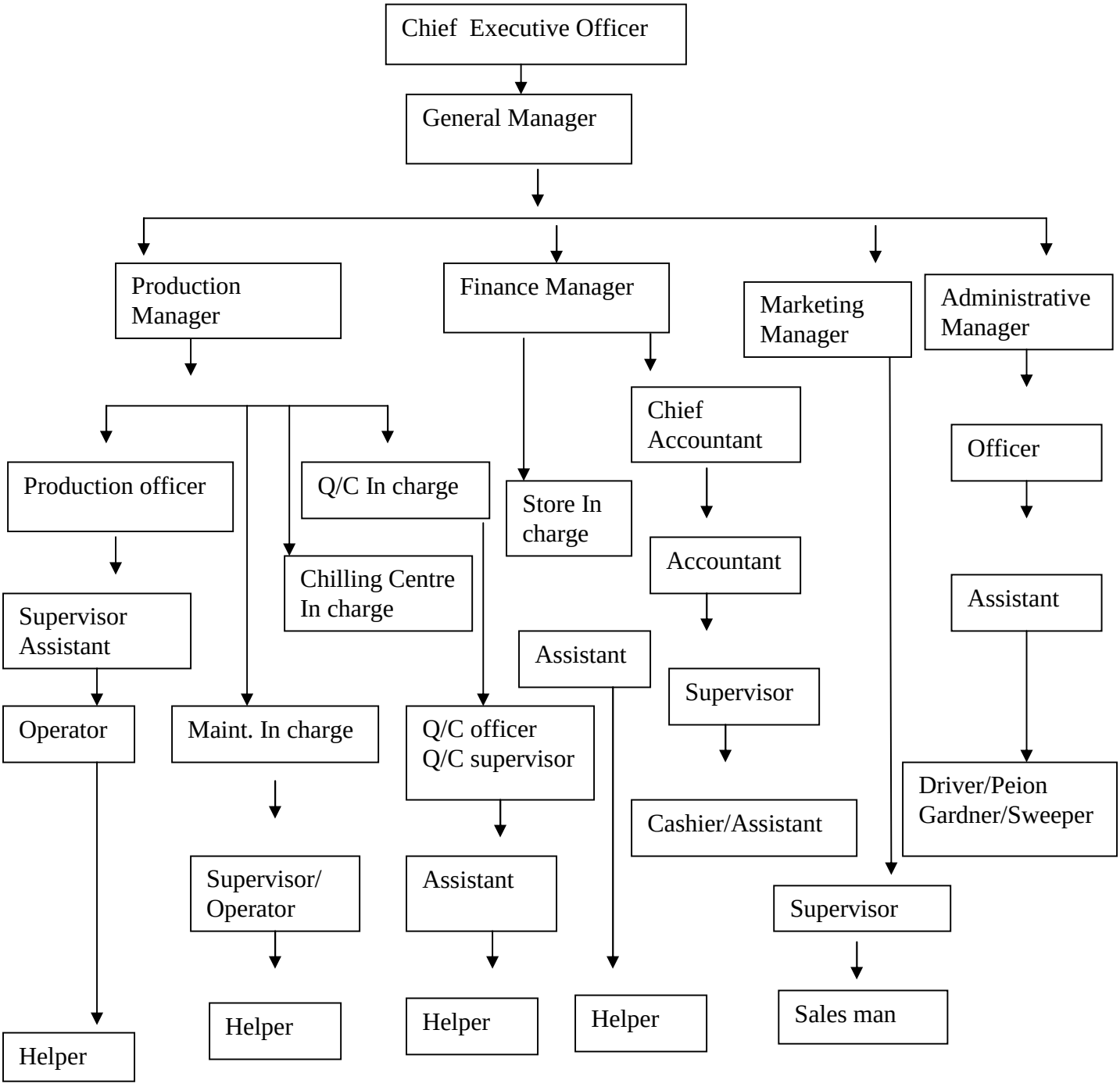
1.2 **Introduction of Sitaram Gokul Milks (Kathmandu) Ltd**.

Sitaram Gokul Milks (Kathmandu) Ltd. was established on July 18, 1996. It is a public limited company and promoted by Kedia organization. The paid up capital of the company is NRs. 61.25 million. The products are pasteurised milk, cream, butter, ghee and yoghurt. The enterprise does not have any collaboration. The company is perceived as the pioneer in the modern dairy industry from the private sector.

Figure:1
Sitaram Gokul Milk (Kathmandu) Ltd.

Chart-1

ORGANIZATION CHART



The milk is the very important and essential food for human body. It's a natural healthy food. It can be used in its natural stage and in various changed form. It is complete food for children. From milk, we can make many other tasty and healthy foods also. Farmers are the main producers of milk.

There is always lack of milk products in town areas due to the big population. To fulfill the demand of milk and milk products in the town areas to produce the hygienic milk and milk products and to solve the market problem of farmers, SGML has started to product and distribute milk and milk products. SGML has been collecting cow and Buffalo milk with the farmers to co-operative centers at the price fixed by the enterprise, then brought to chilling centers. The Enterprise has 13 chilling centers around Butwal ares in Rupandehi District in Western Development Region of the country. The production capacity of pasteurised milk and other dairy products is as follows:

Table – 1

Production Capacity of Pasteurised Milk and Dairy Products

S.No.	Product	Unit	Hourly Production capacity	Annual production capacity
1.	Pasterised Milk, Chocolate Milks, Health Milk etc.	litre	10,000	13,035,000
2.	Butter and Ghee	k.g	N.A.	2,50,000
3.	Chees	k.g	N.A.	45,000

4.	Curd	litre	N.A.	1,00,000

The company sells the pasteurized milk in half litre plastic pouch through dealers and sub dealers. The company has 620 dealers and 1,143 sub-dealers for sale of products in Kathmandu valley. The milk is delivered to 620 dealers in Kathmandu valley by the enterprise owned vehicles.

Sitaram Gokul Milks (Kathmandu) Ltd.

Distribution Channel

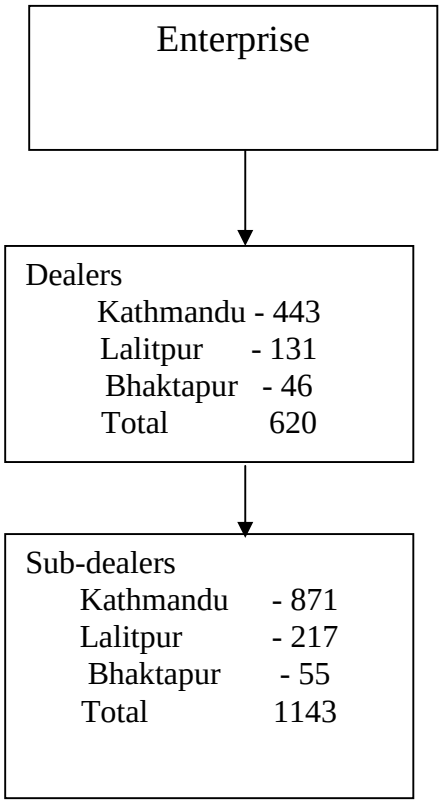


Figure No 2

1.3 Focus of the Study

Inventory management is one of the most important functions in any enterprise. Without any effective and efficient inventory management

non enterprise can achieve its goals. SGML supplies the quality product at right time at a reasonable price. To earn profit the company, it is necessary to run the company more efficiently as well as economically. To ensure this situation in SGML the efficient management of inventory takes vital role.

SGML is manufacturing enterprise, that's why investment in inventory and cost of carrying inventory is required to reduce the total operating cost. The costs of inventory directly affect the production cost as well as profitability of the company. It means a slight reduction in inventory cost reduces the production cost and then increase the profitability at a remarkable rate. The main objective of inventory management is to put the inventory at an appropriate level so that inventory cost can be minimized. This study was focused in the inventory management of SGML. The study can provide the guidelines and help to make the plan, policies and programe for the efficient management of SGML.

1.4 **Statement of Problem**

Most of the Nepalese manufacturing companies are victimized by the unscientific inventory management system. It is one of the most important causes of adverse impact on profit of these companies. In the context of Inventory Management Dr. Govinda Ram Agrawal quoted that "Management experts claims that inventory management in Nepal is probably the weakest aspect of management. The tools and techniques for controlling physical as well as financial dimension."

Inventory takes vital role in the manufacturing company for smooth production and market operation. Inventory consumes the fund or capital which can't be used for any other purpose and thus involve an

opportunity cost. Most of Nepalese manufacturing companies are suffered by the losses due to the lack of study of inventory management, huge amount of money to be blocked on the inventory. How much money should the company invested in the inventory, how much inventories to be stocked, how can we minimize the ordering and carrying cost, what is to be EOQ, how many times we order that minimize the carrying costs are the some questions that evoke management always.

On the basis of above-mentioned activities, the following particular research questions are tried to be answered in this study.

1) What is the inventory management system of SGML ?
2) What are the major problems in the existing Inventory management and control system ?
3) What does impact in profitability due to inventory?
4) How much does inventory keep to improve profitability?
5) How much the Economic order Quantity should be?
6) How can we reduce the inventory cost (ordering and carrying cost)?

1.5 Objectives of the Study

The major objective of this study is to identify the inventory system of SGML. To analyze the inventory management system of SGML. The specific objectives of the study are listed below:-

i. To analyze of inventory of raw material in SGML.

ii. To analyze the position of inventory level in SGML.

iii. To analyze the relationship between inventory and sales, inventory and total assets, inventory and net sales, inventory and current assets, inventory and net profit.

iv. To find out the problem faced by SGML in the management of inventory.

1.6 Significance of the Study

Inventory management is one of the important functions of any organization without effective handling of inventory, manufacturing organization can not achieve its goals. Effective handing of inventory helps the organization reduce the inventory cost. So I think the studies will very importance to improve the performance of SGML. The significance of this study is as follows :

1) The study will be useful to managing the effective inventory policy of SGML.

2) This study will be helpful in management so that it controls the unnecessary expenses of the firm.

3) This study focuses on the inventory control of SGML, so useful for analyze the effectiveness.

1.7 Limitation of the Study

The study being conducted for partial fulfillment of the requirement for Master's degree in Business studies, there are following limitations of the study.

1) This study will focus the inventory management of SGML but it does not concern to other sector of management.

2) The study will be made by the use of secondary data and general interview with administrative Manager.

3) No attempt is done to examine the reliability of secondary data and general interview.

4) It is the study of SGML only. Being just a reference study of SGML only. Being just a reference study, hence the conclusion pointed out form it does not ensure wide applicability in all types of public enterprise running indifferent situation.

5) This study covers only a period of five years (2060/061-2064/065)

1.8 Design of the study

This study has been divided into five chapters, which are as follows.

This first chapter includes Background of the study. Introduction of SGML, Focus of the study, statement of problem, objectives of the study, limitation of the study.

CHAPTER II

REVIEW OF LITERATURE

This chapter deals with review of literature regarding inventory management. The material in the form of raw material, work-in-progress and finished goods are important for the success of enterprises. It can directly affect to the production efficiency of factory, therefore well material and inventory management is highly needed for the factories to effectively run and capacity production. This chapter divided into two parts: Theoretical and conceptual review of inventory management is presented in to the first part and review of related studies in the second part.

Part – First

Conceptual / Theoretical Review

2.1 Meaning of Inventory

The term inventory refers to assets, which will be sold in future in the normal course of business operations. The assets that the firm stores as inventory in anticipation of need are raw materials, work-in-process (Semi finished goods) and finished products.

Inventory is an idle resource, which is useable and has value. The idle resource may be man, money, material, plan requirement.[1] of course inventory is an item of current assets, which is the most important for the successful run of any enterprise whether it is commercial or manufacturing.

[1] Ahujs, K.K production Management (BS publisher and Distributions. New Delhi, 1993, P 310

2.2 Nature Of Inventory

Inventories are stock of the product a company is manufacturing for sale and component that make up the product. The various forms in which inventory exit in a manufacturing industries.

Manufacturing firms generally hold four types of inventories.[2]

a. Raw materials

b. Work-in-progress

c. Final products/Finished Goods

d. Supplies, Stores and Spares

a) Raw Materials

These are goods that have not yet committed to production in the manufacturing firm. "Raw materials are those basic inputs which are converted into finished products through the manufacturing process. Raw material inventories are those units. Which have been purchased and stored for future production."[3]

It consists of item that firm purchased for use in its production process. It may consist of basic materials and a manufactured goods. Maintaining adequate raw materials inventories provides a firm with advantage in both purchasing and production.[4]

Materials used in factory are traditionally classified as direct materials and indirect materials. Direct materials is generally defined to include all

[2] Saradhi, V and Sishita, P, Working Captial Management in public Enterprise, ICPE, The International Center For publish Enterprise in Developing Countries, Yogoslavia (1982).p 31
[3] Pandey, I.M. Financial Management, 7 th Revised Edition, Published by Vikash Publishing House Pvt.Ltd.New Delhi (1995). p 755

materials and parts that are integral part of the finished product and their contribution can be directly identified. Indirect materials are generally defined as materials used in manufacturing process as supporting materials.

b) Work-in- progress

Work-in-progress represents the semi finished goods, they include those materials that have been committed to production process but have't yet been converted into finished goods.[5]

These inventories are semi-manufactured products. They represent produts that need more work before they become finished product for sale. In other way those materials the have been committed to production process but have not yet been converted into finished goods.[6]

Inventory consists of all items that are presently in the production cycle at some intermediate stage of completion. For example they may be in transit between operation or they may be currently undergoing some type of operations. Awaiting the next step in the production cycle, the large its wor-in-progress inventories.[7] Work-in-progress, inventories are a necessary part of modern industrial productions system, since they give each operation in the production cycle, a certain degree of independence firm's production department will want to maintain reasonable WIP inventories to minimize cost delays and idle time. In general, the larger a firm's production cycle, the large its wip inventories.

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[4] Sardhi, V. and Sisthria, P., op cit.p 31
[5] Jain, S.P., and Narang, K.L., op cit. p 68-A
[6] Pandey, I.M., Financial Management, Revised Edition, Published by Vikash Publishing House Pvt. Ltd. New Delhi (1991), p 901
[7] Saradhi, V.and Sisthtia, P., op cit. p 31

Work-in-progress is neither a final product nor a raw materials. It is middle of raw materials and finished goods. WIP inventories are strongly influenced by the length of the production which is the time between placing raw-materials in production and completing the finished products. One problem has to face to separate raw-materials, work-in-progress and finished goods. It depends on nature of production. For milk industry milk is the final product. But a sweet industry uses this milk as raw materials.

c) Finished Goods/ Final Product

These inventories are those completely manufacturing product which are ready for sale. Stocks of raw-materials and work-in-progress facilitate production while stock of finished goods is required for smooth marketing operations. Therefore finished goods are completed goods a waiting sale. In a manufacturing concern. They are the final output of production process.[8]

These are completed products waiting for sale in the manufacturing firm, they are the final output of the production process. The finished goods inventory represents products that are ready for sale. For these items the precaution process is complete.[9]

i) Ghee
ii) Butter
iii) Milk powder
iv) Sklmmed Butter Milk
v) Youghurt(Dahi)
vi) Cheese

[8] Pandey, I.M., op cit, p901 (Revised Edition)
[9] Weston, J.F. and Bisley, S. and Bfigham, E.F., Essential of Management Finance. The Dryden Press (USA).

d) Supplies, Stores and Spares

Firms also maintain the forth kind of inventory of supplies. Supplies include office and plant cleaning materials (soap, broom etc)Oil/fuel, lights, bulb and the like these materials don't directly enter into production, but the necessary for production process. Usually these supplies are small part of the total inventory and don't involve significant investment.[10]

2.3 Need/ Importance/ Benefits of Holding Investments

The basic reason to hold inventories is to keep up the production activates unhampered. It is neither physically nor economically justifiable to wait for the stock to arrive at firm when they are actually required. Production and delivery of goods are not instantaneous. So there is used to hold inventories, so that customers may be delivered goods or service immediately. Therefore keeping of inventories is a must for the efficient working of industrial unit.

The question of managing inventories anises only when the company holds inventories. Maintaining inventories involves trying up of the company's funds and incurrence of storage and handling costs. If it is expensive to maintain inventories, why do companies hold inventories.[11]

According to Chorles T. Horngren "Inventories are cushions a)To absorb planning errors and unforeseen fluctuations in supply and demand and b) To facilitate smooth production and marketing operations further inventories help isolate or minimize the interdependence of all parts of

[10] Pandey, I.M., op cit.p 755 (7 th Edition)
[11] Jain, S.P.and Narang, P.G., op cit p 69-A

the organizations (For example, departments of functions). So that each may work effectively.[12]

The importance of inventory to an organization can be listed as:-

a) Provides and maintain good customers service.

b) Enables smooth flow of goods through the production process.

c) Provides precaution against the uncertainties of demand and supply.

d) Various production operations can be performed economically and independently. It can allow temporary varieties in operations cases.

e) Ensures a reasonable utilization of equipment and labour.

f) With purchase in bulk discount can be availed.[13]

Although holding inventories involves blocking of a firms funds and the cost of storage to facilitate uninterrupted production and smooth running of business. In the absence of inventories firm will have to make purchase as soon as it receives orders. It will mean loss of time and delays in executive of orders which some orders. It will mean loss of customers business. A firm also needs to maintain inventories to reduce ordering cost and avail quantity discounts, etc. Generally speaking, there are three main purpose or motives of holding inventories.

[12] Star, M.K. and Miller, D.W., Inventory Control: Theory and Practice, Fifth Printin, Published by Prentice Hall of India Private Ltd., M-97, Connaught Circus, New Delhi-110001, October-1990 p 357
[13] Goel, B.S., Productions and Operation Management Published by Pragati Prakashan, Meerut-1992. p 259

1) ***The transaction motives :*** Which emphasis the need to maintain invetories.

2) ***Facilitate smooth production and sales operations***

3) ***The precautionary motive :-*** Which necessitate holding of inventories to guard against the risk of unpredictable changes in demand and supply forces and other factors.

4) ***The speculative motive*** :- Which influences. The decision to increase or reduce inventory level to take advantage of price fluctuations.[14]

There are many benefits of holding inventories. A firm has to keep enough inventories not least. Inventories are used to provide cushions so that the purchasing, production and sales functions can proceed at their own optimum paces. In achieving the separation of these functions. The firm realizes a number of specific benefits.[15]

i) Avoiding Losses of Sales

If the firm does not have finished goods available for sale. It will lose sales. There is much competition in the market. Customers will purchase from that firm who gives immediate delivery. The firm have to compete with another firm who transact the same goods so the ability of the firm to give quick service and to provide prompt delivery is closely tied to the proper management of inventories.

[14] Sharma, R.K. and gupta, S.K. op cit.p 22.25
[15] Man Mahon and Goyal, S.N., Principles of Management Accountancy, Published by Shahitya Bhawan Publication Hospital road, Agra – 282003, Printed at Bhauvan Printers Agra (1997). p A-69

ii) Gaining Quality Discount

If a firm is willing to maintain large inventories. If may be able to make but purchase of goods of large discount. By obtaining large discount the firm's profit may increase as long as the cost of maintaining the inventories are less than the amount of the discount e.g. if cost of storing an item is estimated as $ 1and discount is $ 3 The firm benefits by $ 2 per unit from the quantity discount.

iii) Redacting Ordering Costs

Every time a firm places an order places an order it is necessary. It incurs cost such as transportation, insurance, inspection, stationery, and Bank expenses etc. The total ordering cost may reduce if the firm places an order at fewer times. It actually take a lot of money. So a few orders most be placed so that ordering cost may reduce.

iv) Achieving Efficient Production Runs

It is necessary to continue the Production run; a firm must keep enough raw-materials. If the set-up cost is $ 200 and run produces 200 units. The Production run cost per unit is $ 1. A Longer run of 2000 units would reduce the set-up cost to $ 0.10 %. Inventories assist the firm in marking sufficiently long runs to achieve efficient production.

a company should maintain adequate stock of materials so that it is possible for a company to procure raw materials whenever it is needed. Some time there exists uncertainty in procuring raw materials. Procurement of raw materials may be delayed because of strike, transport disruption or short supply. Therefore the firm should maintain sufficient stock of raw materials at a given time to continuous productions.

2.4 Meaning of Inventory Management

Inventory management involves planning, of the optimal level of the material and cost control of material cost supported by an appropriate organization structure. Which is staffed by trained person and directed by the top leveled management. It involves both financial dimension as well as physical dimension and these dimension are interrelated and can't be looked in isolation.

Inventory in the form of raw material, Work-in-progress and finished goods are of great significance for the success of an enterprise. These can directly affect the efficiency of a system. It is observed that irrespective of the size of an enterprise. The expenditure on materials is a major item of the budget. In many cases materials consumption varies form 25% to 75% of sales turnover. The expenditure made on materials is money invested in inventories cost of storage, transportation cost, insurance, wastage etc. Because of the magnitude of expenditures required on controlling inventory and their impact on profit. A great deal of attention is required towards the management of operation associated with materials.[16]

Materials management is one of the aspects of production management. Production management is developed and handled by production engineer. Its specialist handles procurement. Therefore later inventory management becomes a separate and significant management for the development of industries. Under the inventory management there is not only essential production approach but also need marketing management

[16] Goel, B.S., op cit p 270 (2nd Edition)

but actually inventory management is purely subject of production management.[17]

The inventory management is assumed to be required to maintain an adequate supply of correct materials at the lowest total cost. The responsibility of determining the material requirement implied by the marketing forecast and liaising with the purchasing department for their acquisition, receiving and storing the material safely and in good condition for its subsequent issue and identifying surplus stock and taking action to reduce it.[18]

Inventory is working capital and therefore the control of inventories is an important aspect of operation management. The basic questions in the management of inventory are :-

i. How much inventory to keep and

ii. When ?

Before getting to a mathematical treatment of the above questions, let us understand the function of inventory management.[19]

i) There are inventories for normal consumption requirement. Therefore depending upon the average consumption requirement rates and age rave lead times for procurement/ manufacture of the materials, Inventories is kept at the appropriate time.

ii) A Production process however continuous it may be is bound to have some interruptions. It may also have

[17] Chary, S.N., Production and Operation Management, Published by McMeraw Hill Publishing Company Limited. New Delhi, Tata MC (1994), p 387.
[18] Muhlemann, A., Oakland, J. and Lockyer, K., Production and Operation Management, 16th Edition, University of Brodford, Reprinted in India, By Macmillan India Ltd. (1996) . p 364
[19] Chary, S.N. op cit.p 120

imbalance in the consumption and production rates of the materials at different stage at the production process this interruptions and imbalances make it necessary to kept stocks of inventories between the different stages of the operation.

Every enterprise needs inventory for smooth running of its activates. Its serves as a link between production and distribution process. There is generally a time lag between the reorganization of a need and its fulfillment. The greater the time lag, the higher the requirement for inventory. The unforeseen fluctuation in demand and supply of goods also necessitate the need for inventory.

It also provides a cushion for future price fluctuations. About 90% part of working capital is invested in inventories it is necessary for every management to give proper attention to inventory management. A proper planning of purchasing, handling, storing and accounting should from a part of inventories management.

An efficient system of inventory management determine. [20]

1) What to purchase
2) How much to purchase
3) Form where to purchase
4) Where to store

Inventory management is one of the aspects of production management. Production management is developed and handled by production engineer procurement is handle by its specialist. Therefore later inventory management becomes a separate and significant management for the

[20] sharma, R.K. and Gupta, S.K., op cit. p 22.23

development of industries. Under the inventory management there is not only essential production approach but also need marketing management but actually inventory management is purely subject of production management.[21]

Executive in production, purchasing and marketing departments, take decisions relating to inventories primary. Usually raw materials polices are shaped by purchasing and production executive. Work in progress inventory is influenced by the decision of production executives and finished good's inventory police is evolved by production and marketing executive. Yet as inventory management has an important financial implication. It has the responsible to ensure that inventories are properly mentored and controlled. It has to emphasis the financial point of view and initiate programmed with the participating and involvement of other for effective management of inventory.[22]

Thus, material/inventory management means not branch of production management it is an integrated view of management "Compares devote a great deal of attention to the efficiency of their materials and inventory management operation. A brief at the historical evaluation of material faction will give us a fuller appreciation of the current situation. Up unit the time F.W.Taylor, the production foreman was all intents and proposes in complete control of the precaution activity. He hired, fired and promoted, he purchased the necessary raw materials scheduled production and handled individuals almost all of the other aspects of production." [23]

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[21] Pandey, I.M., op cit.p 826 (7th Edition)
[22] Chandra, P. *Financial Management Theory and Practice* Second Edition, India Institute of Management, Bangalore, Total Mc Graw Hill Publishing Company Limited, New Delhi. p 328
[23] Gareett, L.T. and Silver, M., *Production Management Analysis* , 2nd Edition, Harcourt Brace

2.5 Objective Of Inventory Management

Efficient management of inventory should ultimately result in maximization of the owner's wealth. Inventory should be turned over as quickly as possible. Avoiding stock out that might result in closing down the production line or lead to a loss of sales. It implies that while the management should try to purpose the financial objective sufficient inventories so satisfy production and sales demand the objective of inventory management consists of two counter balancing parts:-[24]

a)To minimize the firm's investment in inventory

b) To meet a demand for the product be efficiently organizing the firm's production and sales operation.

The objective o inventory management is to improve profitability by minimizing the costs associated with investment in inventory like most financial decision. The inventory management problem involves a trade off between risk and return. Carrying larger inventory reduces the risk of lost sales, customer ill will and production with holding inventory rise. Although most financial managers are non involved directly is setting inventory levels they do have responsibility efficient overall investment of the firm's scarce resources.[25]]

The main objective of inventory management are operational and financial, The operational objectives mean that the materials and spares should be available in sufficient quantity so that work is not disrupted for want of inventory. The financial objectives means that investment in inventories should not remain idle and minimum working capital should

[24] Khan, M.Y. and Jain. P. K., op cit. p 714
[25] Henderson, G.V. Jr, Trennepohl, G.L. and Wert, J.E., *An Introduction to Financial Management* Published by Addison-Wesley Publishing Company, Menlo Park, California, London. p 261

be locked in it, The following are the objective of inventory management.[26]

i) To ensure continuous supply of materials spears and finished good so the production should not suffer at any time and the customers demand should also be meet.

ii) To avoid both over-stocking and under-stocking of inventory.

iii) To maintain investment in inventories at the optimum level as required by the operational and sales activities.

iv) To keep material cost under control so that they contribute introducing cost of production and overall cost.

v) To eliminate duplication in ordering or replenishing stocks. This is possible with the help of centralizing purchase.

Therefore, the objectives of inventory management should be to avoid excessive and inadequate levels of inventories and maintain sufficient inventory for the smooth production and sales operations. Efforts should be made to place an order at the right time with the right sources to acquire the right quantity at the right price and quantity. Effective inventory management objectives can be summed up as follows :-[27]

a) Ensure a continuous supply at materials to facilitate uninterrupted production.

b) Maintain sufficient stocks of raw materials in period of short supply and anticipate price changes.

[26] Sharma, R.K. and Gupta, S.K., op cit. p22.24
[27] Pandey, I.M., op cit. p 902 (Revised Edition)

c) Maintain sufficient finished goods inventory for smooth sales operation and efficient customer service.

d) Minimize the carrying cost and time.

e) Control investment in inventors and keep it at an optimum level.

Thus, material is an important factor of production in a manufacturing organization. It is the first and the most important element of cost. According to the Indian association of materials management. 64 paisa on labour and the rest of one rupee of cost is spent on overheads. So the objective of inventory management has to give more emphasis on the material management the reducing the cost of production and improving the profitability. Studies by experts in the field have brought out that if an organization can effect 5% saving in material cost, it would be as good as inversing the production or sales by about 36%.

On the other hand, the management should try paying adequate attention to the inventory management to reduce the cost of production and working capital requirements. In fact, an uncontrolled inventory can become the industrial units cancer.

Two levels of inventory control exit quantity or unit control a rupee of financial control production executive and storekeeper is primarily interested in quantity control. On the other hand financial cactuses are interested that too much money should not be invested in inventory and every rupee spent in inventory should efficiently and effectively utilized.

The objective of inventory management should be to determine and maintain optimum level of inventory. The optimum level of inventory will lay between two points of excessive and inadequate inventories.

Firm should always avoid over investment or under-investment in the inventories. Due to over investment unnecessary tie-up the amount that we can't invest in other propose. Excessive carrying costs risk of liquidity. Excessive carrying costs will impair the firm's profitability further. Due to over inventories, it may not be possible to sell them in time and at full value. Similarity, work-in-progress is far more difficult to sell. In the same way finished goods inventory should sold at low prices due to falling the price in market and the seasonal factors. So more investment in inventories in harmful to producer/company. It should be cut down.

Under investment in inventories also not good for company. It carries some problems such as production hold-ups, frequent production, and interruptions. If finished goods are not sufficient, we do not meet the customers demand and our goodwill also lost. Thus the objective of inventory management should be neither excessive nor inadequate level of inventories but maintaining sufficient inventory level for the smooth production and sales operations. An optimum level of inventory should be determined on the basis of the trade off between costs and benefits. The various objectives of inventory management can be summarized up as follows.[28]

i) Availability of all items of inventory.

ii) No excessive investment in inventory.

iii) ***Reasonable price :*** when we purchase the raw materials, these should be strict on the pricing the raw materials. It should be reasonable low price, but we do not ignore quantity be keeping

[28] Man Mohan, Goyal, S.N., op cit. p A-69

lower prices materials. Firm should be adjusted between price of raw material and its quantity.

iv) ***Minimum wastage*** *:-* There should be minimum wastage of material while storing in the god owns by the workers. Wastage should be allowed up to a certain level known as normal level of wastage and if should not exceed that level. Storekeeper and workers should be trained to handle the material in a scientific way to avoid the wastage.

v) ***Risks of spoilage and obsolescence*** of inventory must be avoided. For this purpose, a maximum quantity of each item of inventory is determined and proper method of issue of inventory is followed LIFO and FIFO method is used to issue the inventory.

vi) ***Information about availability of stock*** should be made continuously available to e management so that planning of production may be done. The storekeeper can supply this information because he keeps an up-to-date record of every item of stocks under a proper system of inventory control.

vii) Internal checking of inventory of raw material and finished goods, which is a part of inventory control.

2.6 Importance Of Inventory Management

The important of Inventory management was highlighted in the following aspects of management.

"Material research, purchase intelligence, market research management information system, right information system, creative purchasing, materials intelligence etc. are often used in the control of the scientific

inventory management, but a major handicap in purchasing in the lack of co-ordination of activities and material research is the most neglected aspect in many organizations. The four decades of industrialization in the country has made the buyer shoulder heavy responsibilities. Purchase research helps in visualizing the underlying possibilities, within the economy, and hence comes out with a future vision, forecasts, and future problems and suggests suitable solution in a scientific manner.[29]

"Inventory management is vitally important to almost every type of business. Whether product or service oriented, inventory control touches almost every fact of operations.

Since the health and welfare of a community in involved it would be easy to take approach that large volumes of every thing must be kept on hand to ensure that there will never be a shortage. But customers also like low rate and costs of inventory on hand can easily exceed 5% of the annual reserves of the utility. Thus the proper balancer must be struck to maintain proper inventory with the minimum financial impact on the customer.[30]

"Inventory management is an important function of an organization covering various aspects input process, i.e. it deals with raw materials, procurement of machine and other equipments necessary for the production process and spare parts for the maintenance of the plant, Thus in an production process inventory management can be considered as an preliminary to transformation process, it involves planning and programming for the procurement of material and capital goods of desired quality and specification at reasonable price and at the required

[29] Gopalkrishana, P., *Purchasing and Material Management*, New Delhi, Tata Mc, Graw Hill Publishing Company Ltd. (1993). p28

time, it is also concerned, storage and stock control, inspection of the material received in the enterprise, transportation and material handing operation related to materials and many other functions.[31]

As already stated that inventory management is important for proper inventory handling system. It is important that models of inventory system reflect true incremental costs associated with alternate plans or polices; there cost represent out of pocket expenditures or foregone opportunities of profit. Cost figure derived form the normal according records usually do not fit the requirements the following types of costs items are often incremental costs in inventory models. Costs depending on the number of lots, production costs, handling and storing costs, costs of storage and capital investment costs.

The important of inventory management can be realized when it is said that purchase account for nearly 50% of an organization's annual expenditure. That nearly 80% of the working capital is tied up in inventory and the carrying cost is almost 25% a year. That material represent 40 to 60% of hte sales price or 60 to 80% of the production cost of a product and that even a saving of 5% in material cost will substantially increase the profit margin of an enterprise.[32]

Therefore, The pressure for operating capital has made business an increasingly a ware of inventory as form earning investment. Why are we always out of stock? A complaint form a large number of businessman faced with the dilemmas and frustrations of attempting simultaneously to maintain stable service and keep investment in stocks and equipment at

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[30] Adams, E.E. Jr. and Bert, J.E. *Production and Operation Management* , Prentice Hall of India Pvt.Ltd. New Delhi-2000. p 450.
[31] Goel, B.S. op cit, p 237
[32] Nair, N.K., Purchasing and Material Management, Vikas Publishing House Pvt. Ltd., New Delhi-1994, p 3

reasonable levels. In order to get at the answer to this question as a basis for taking action. It is necessary to step back and ask some rather different kinds of questions. Why do we have inventories? What affect the inventory balance we maintain? How do thee effects take place? Form these question a picture of inventory problems can be built up which shows the influence an inventory policy it to strike a balance between operating savings and costs of capital requirements associated with larger stocks. Striking this balance is easier to say then do.[33]

Thus, Inventories must be acquired ahead of sales. This is a critical difference and the necessity of forecasting sales before establishing target inventory level makes inventory management a difficult task. Also, because errors in establishing inventory levels can lead either to lost sales and profits or to excessive costs and hence profit problems.. Inventory management is as important as it is difficult. Inventory management must maintain inventories of levels, which balance the benefits of reducing the level of investment against the costs associated with lowering inventories.

Inventory management fuscous on three basis questions:-[34]

i. How many unit of each inventory item should the firm hold in stock?

ii. How many unit of each inventory item should the firm hold in stock?

iii. At what point should inventory be ordered?

The above different waters views show the importance of inventory management. It is not needed and impotent for underdeveloped countries

[33] Gitman, L., J., op cit p 246
[34] Weston, J.F. and Brigham, F.F. Essentials of Managerial Fiancée, Printed in the United States

but also important and needed to the developed countries in their stage of development of being heavily dependent on other countries for the manufactured goods have always been emphasizing for establishing such industries that can fulfill our needs. Therefore, there of the country is to unitize our domestic resources in the fullest extent and also help to save the foreign exchange. Proper management is the industries safely result for growing manpower and correcting the balance of payment situation.

2.7 Role Of Inventory Management

According to K.K Aujajk, Material/inventory management is concerned with the planning and programming of materials and equipment, market research for purchase, pre-design value analysis, procurement of all material, packing and packing materials, store, control and inventory contral transportation of raw material, work-in-progress, and finished goods, spares part, material handling value analysis, disposal of scrap surplus and salvage. Inventory managements basically a most important functional area of any organization or undertaking to achieve the best results, so far as profitability is concerned.

"Inventory management covers a much winder field and deals with all aspects of material supply and utilization as well as costs, work-in-progress and supply of finished goods. It is concerned with the entire range of function which affect the flow, conservation, utilization quality and cost of materials it covers that aspect of industrial management which is concerned with the activates involved in the acquisition storage and flow of all materials directly and indirectly employed in the production and marketing of finished goods.[35]

.Holt-Saunders International Edition (1978).p 490

[35] Ahuja, Pro.K.K, Production management, First Edition, Sansh Kumar Jain For CBS Publisher and Distributions, 485, Jain Bhavan, Bhola Nath, Shahdara, Delhi-110032. (1993) p.342

"Mr. Sandern's remarks gives clear evidence that managing conversion system affecting entails attention to material/inventory management including programme materials, co-ordination materials, availability and controlling materials utilization, managing work-in-progress goods etc. As a practitioner Mr. Sandern's recognize that complexities of producing numerous different products can cause confusion inefficiencies and inferior customer services management is better able to control is such as entrainment. If it get timely and accurate information. A material requirement planning system can provide this vital information.[36]

"Inventory is composted of assets that will be sold in future in the normal curse of business operation. The assets which firm store as inventory in anticipation of need are 1. Raw materials 2. Work-in-progress (Semi finished goods) and 3. finished goods. The raw material inventory contains items that are purchased by the firm from others and are converted into finished goods thought the manufacturing process"[37]

Therefore inventory management is one of the major department or area of an organization, which management basically includes the following activates.

1. 1.Purchasing
2. Transportation
3. Inventory control
4. Protective packaging
5. Market forecasting
6. Material handling
7. Order processing

[36] Adams, E.E. Jr. and Bert, J.E. op cit. p 455
[37] Khan, M.Y. and Silver, M.op cit. p 358

8. Customer service
9. Storage and warehousing
10. Producing of goods.

Thus it is easy to see that even slight changes in material cost will exert a great influence of a firm's profit picture. It is said that half of the profit margin will increase if its materials cost decreased by double of it which in torn will produce a relative increased by over 10 times in increase sales. In other words it can be achieved this same increase through additional sales, the firm would have to boost sales, its exert a tremendous leverage on profits companies can make or loss large sums depending upon how efficient they are in purchasing and controlling inventory.

"Inventory management taken a broad view of the basic purchasing tasks including in it all aspect of purchasing and supplying goods.[38]

1. ***Purchasing*** **:-** The procurement of materials as authorized in requisitions from production department.

2. ***The control of supply items*** **:-** The procurement and inventory control of standard non-production goods, including office supplies, tools maintenance equipment and other operating goods.

3. ***Inventory control of production items*** :- The determination of inventory level and purchase qualities required meeting production schedules, also the maintenance of physical inventories and their associated inventory records.

4. ***Receiving*****:-** The receipt inspection identification and movement of incoming materials.

5. ***Traffic*** **:-** The determination of the means of shiftiest for both incoming and outgoing materials.

6. ***Shipping*** **:-** The packaging and labeling to the finishing goods.

Some firms have also included the production control function under inventory management. This has been done principally in case where the manufacturing operation is short cycle and relatively simple. So that the value added is comparatively small."

2.8 Factors Affecting Inventory Management

The meaning of inventory management, importance of inventory management, and role of inventory management are already presented. The major factors affecting the inventory management are as follows:-

"Any organizational exercise has to take care of two important factors, interrelation amongst the constituents within the section and interrelations with outsiders. The purchasing decision, being the major expends of the company's finances in order to procure goods and services will have major interfaces.

a. With the finance department who provide the funds and b) The user departments for whose consumption the purchased are made. The purchasing department will also have extensive interactions with the materials planning section, which plans the requirement and stores section, which the custody of purchase goods, quite expectedly, in more and more companies these three section,- purchase, storage and inventory planning-are being brought together under a common inventory management division, in

[38] Garrett, L.T. and Silver, M. op. cit. p358

accordance with this new thinking on an integrated approach of inventory management"

"Inventory planning is the scientific way of determining the requirements of raw materials components, spare and other items that go into meeting the production need with in economic investment polices."

According to P.Gopal Krishnan, that factor influencing inventory planning is:-

i. State of health of national economy.

ii. Price trend and validity.

iii. Credit policies.

iv. Direct and indirect taxes.

v. Foreign exchange regulation.

vi. Import policies.

vii. International market condition.

viii. Business cycle.

ix. Corporate objectives.

x. Technology for the terms.

xi. Demands of the items.

xii. Supply of the item.

xiii. Transportation losses.

xiv. Total lead-time.

xv. Rejection rate

xvi. Working capital

xvii. Storage capacity

xviii. Plant utilization

xix. Communication system.

xx. Seasonal factors.

xxi. Location of plant and Location of supplier.

xxii. Cost critically reliability and availability items

xxiii. Information of substitute products.

xxiv. Techniques used to determine forecast.

Another important factors of management are materials handling system. "A poor materials handling' system always results in accumulation of work in process and lower motivation. Scientific materials handling is concerned with moving the right quantity of materials at the right time, in a given price form the consumer, It deals with the science involving movement, packing and storing of martial can be vertical, horizontal, in batches, in one pieces or unit loan with or with out the aid of gravity. This function including every consideration of the product, except the actual processing operation. The handling is usually included in integral part of transportation and production process."[39]

"The requirement of raw materials then depends upon the requirement of production of the finished product (assemble or shampoo or medical formulation). It seems it would be better if we know the production plans/schedule for the assembly of the finished product and accordingly arrange for all the raw material that go into the finished products rather then depending upon statistic and probabilities"

[39] Gopal Krishnan, P., op. cit.p23

"Inventory handling is the science of moving materials from one place to another. Inventories include raw materials, finished goods, finished component, packing material, operational supplies, and tools. Jigs and fixtures, scrap etc. Inventory handing is closely connected with the storage of materials any stores organization. One of the major problems, to which considerable thought should be given, is material handling.A good deal of labor and money can be saved by using the right method and proper equipment in the movement of inventory."[40]

Another important factor influencing inventory management is store keeping or inventories control management.

"An efficient Inventory management system includes the means to ensue that the stocks are maintained to optimum levels and in quantities the prevent interruption in flow of needed resources. The aim is to avoid teh negative effects of both excessive and insufficient stocks, which can be disrupted financially and operationally. Effective Inventory management is necessary to ensure adequate supplies at optimum cost, as inventories act as cushion between supply and demand. Raw material, production components, work in progress and finished goods for the seasons of the existence and size if the inventory."[41]

Lastly, inflation is also important factor which influencing effective inventory management.

Moderate inflation say 3% per year can largely be ignored for purpose of Inventory management but at higher rates of inflation it becomes important to consider this factor, If the rate of inflation in the types of goods the firm stocks tends to be relatively constant. It can be deal with

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[41] Nair, N.K., op cit. p 280s

easily. One simply deducts, the expected annual rate of inflation from the carrying cost percentage. The reason for making this deduction is that inflation cause the value of the inventory to raise. Thus off setting somewhat hte effects of depreciation and other carrying cost factors. The calculated EOQ and hence the average inventory will increase however the higher the rate of inflation, The high interest rates will be and this will cause to increase and thus lower the EOQ and average inventories.

On balance there is on evidence that inflation either raise or lowers the optimal level of inventories of firms in the aggregate. It should still be thoroughly considered however, for it will raise the individual firm's optimal holding if the rate of inflation for its own inventories is above average land is greater than the effects of inflation on interest rates and vice versa.[42]

Therefore "The inventory policy of an organization has an impact on the whole system. There are a number of factors, which can affect the inventory decisions. These can be broadly divided in the following categories.

(A) Characteristics of the manufacturing system.

i. Degree of specialization of differentiation of the product of various stages.

ii. Process capability and feasibility.

iii. Production capacity and storage facility.

iv. Quality requirements shelf line and obsolesce risks.

v. The nature of the production system.

(B) Amount of production against shortages.

i. Changes in size and frequency of orders.

ii. Unpredictability of sales.

iii. Physical and economic structure of distribution pattern.

iv. Costs associated with failure to meet demand.

v. The accuracy, frequently and defile to demand forecasts.

vi. Production against breakdown or the interruption in production.

(C) Organization factors

i. Labor relation policies of the organization.

ii. Amount of capital available if invested elsewhere.

(D) Other factor

i Inflation

ii Strike situation in communication facilities.

iii. Wares or some other natural calamities like famines, flood.

iv. Difference between input and output.

Thus, the major problem areas that heart of inventory management are:-

i) The classification problem to determine the type of control required.

ii) The order quantity problem

iii) The order point and

iv) Safely stocks.

[42] Weston, J.F. and Brigham, E.f., op cit. p491

2.9 Inventory Cost

The goal of the inventory management is to provide the inventories for sustaining operation at the lowest possible cost. The first step in inventory management is to identify all the costs involved purchasing and maintaining inventories typical costs associated with the inventories are describes below.

a) Carrying/Holding Costs

Total carrying generally increases in direct production to the average amount of inventory carried. Inventory carried in turn depended upon the frequency with which orders are placed. The cost associated with having inventories. Which includes storage cost, insurance cost of typing up fund, depreciation cost and so on. These costs generally increase in proportion to the average amount of inventory held. To illustrate it a firm sales S unit per year and if it places equal order N times per year then Q=A/N unit will be purchased with each order. If the inventory is used evenly over the year and if no safety stocks are carried then the average inventory A will be

Average inventory (A)= unit per order /2 = (S/N)= Q/2

Defining the annual percentage carrying costs as, C, annual total carrying cost as (TCC), as the percentage carrying costs C times, price per unit PP times the average inventory in units A.

Total carrying costs TCC =C P.P A=CPP Q/2

The inventory carrying costs are further explained as

Capital Opportunity Cost

This consists of expenses of rising funds (interest on capital) to finance the acquisition of the inventory. If funds were not locked up in inventory. They have earned a return. This is opportunity cost of the funds or financial cost components of the cost.[43]

Funds associated with inventory are not available for other uses. Therefore, an opportunity cost determined by the alternative use4 to which could be put. For example, from the alternative use if firm can earn 10% then the capital cost of the inventory is 10%.

i) ***Handling Cost***

The size of consignments and the materials handling facilities in the store determines these costs up to a certain level of inventory size per unit handling cost decreases with the level per unit handling cost starts increasing.

ii) ***Storage Cost***

The cost associated with maintenance of inventory is storage cost. These include expenditure made on inventory staff, expenditure to provide various facilities like heating, lighting, floor, shelves and racks, bins and containers, materials handling equipments and other provisions for safe and proper storage of items. These costs generally depend upon the volume to value ratio of an item.

[43] Khan, M.Y. and Jain, S.P., op cit. p 728

iii) ***Spoilage and Shortage Cost***

Many products deteriorate over time in storage. The precise nature of the deteriorate various from product to product but whatever the causes, it represents reeducation in company's assets and such is a cost of holding inventories. This is term as a spoilage cost. Sometimes because of shrinkage and pilferage of inventory.

iv) ***Depreciation Cost***

In every organization, the value of the capital investment decreases with time. Thus, there is a tendency among organization to reduce its capital investment on machines and other equipments. The deprecation costs are thus reduced. Naturally the desired among of production with running the machines in slack period thus increasing the size of inventory.

v) ***Insurance and Taxes***

Many of the goods in inventory required and it should be included in inventory holding cost. Weather the year. The inventory a firm has on hand those data's the higher their tax bill will be. Where such taxes are in effect prudent inventory management may dictate periodic reduction in inventory to coincide with the data on which the assents are made.

vi) ***System Cost***

Another type of inventory carrying cost, which is associated with the administration of inventory system, is known as system cost. These costs Supervision, physical stock checking and maintaining the record keeping equipment cost. It is difficult to determine weather these expense will be

high or low expect by making a comparison amount actual inventory system.

(b) Ordering Costs

It is assumed that carrying costs are entirely variable and increase in direct proportion to the average size of inventory, ordering cost usually are fixed regard less of average size of inventory. For example the cost of placing and increasing in an order generally interoffice memos, using fax transmission or long distance telephone cells and taking delivery-essentially are fixed regardless of average size of an inventory.[44]

In practices the cost per order generally contains both fixed and variable components, since of portion of the cost-such s that of receiving and inspecting the order normally varies with the quantity order. Ordering cost may differ in the sense of inventories nature. In case of raw materials ordering cost involves the clerical cost in placing an order as well as certain cost receiving and checking the goods once they arrive. For finished goods, ordering cost involves scheduling a production run, and for keeping. Furthermore, ordering cost are the cost involved in placing and receiving an order or purchased items. The expenses involved in this costs are :-

a) Cost of placing an order

b) Requisition cost

c) Receiving inspecting and storing costs

d) Sales fax, customs etc

e) Clearing and for wording cost

f) Insurance of raw materials

g) Stationery cost

h) Bank commission/expense

i) Telephone/fax/ postage/expense

j) Cost incurred when raw materials raw in transit

k) Transportation/ Shipping cost

Ordering cost increase with the number of order, thus more frequency in inventory acquired, higher the firm ordering cost. On the other hands if the firm maintains large inventories levels there will be a few orders placed and ordering cost will be relatively small. Thus, ordering costs decrease with ordering inventories as O and we placed N order per year, the total ordering cost is given as

Total ordering cost (TOC) = O×N = $O\left(\frac{S}{Q}\right)$

Where,

Toc= Total ordering cost

O= Fixed cost per order

N= Number of order placed per year

Q=Inventory quantity for each order

(c) Stock Out Costs

Stock out cost is associated with demand. The depletion in stock results in loss of sales or back order costs. When the sale are lost due to stock out, the firm losses both the profit margin on unmade sales and the firm's goodwill. If the customer uses another business else where, future profit margin may also be lost and back order cost in needed to convince customers to use again after inventories have been replenished. Back

[44] Weston, J.F. Bisley, S and Brigham, E.F. op cit p 429

order cost includes loss of goodwill, money paid to re-order goods and notification to customers when goods arrived.[45]

2.10 Inventory Cost Control

Dr. Govinda Ram Agrawal has started that the process of inventory cost control as below.

1. Predetermining the standards for each item inventory both in terms of cost and quantity the establishment of standard specifications of materials are the starting point in cost control.

2. Measuring actual performance of each item of inventory both in item of cost and quantity.

3. Comparing actual performance with standard to isolate variance, Analyzing variances as to their incidences and cause.

4. Talking corrective action to eliminate variances.

Most of the inventories costs are controllable cost all aspect of inventory management, material planning, purchasing, receiving, storekeeping, issuing are the primary areas of controlling. Cost control can be effectively exercised on inventories.[46]

Pusker and Duegest the several ways to achieve cost reduction through inventory management, they are:-

1. Incurring loss expenditure on purchases materials and services by.

[45] Adwms, E.E. Jr. and Bert, R.J.E., op cit. p 412
[46] Agrawal, G.R. Dr. *Inventory Cost Control*, (Management day Sov venir, Production Management), Gandhi Bhawan Kathmandu-1981.p41

a. Reducing cost of purchased item by a continuous search for materials which are cheaper more reliable in quantity and obtainable form sources which facilities smooth delivery.

b. Using less material per unit of production or increasing yield and reducing waste.

2. Reducing cost of storage including inters on capital investment space, insurance and handling by proper inventory control.

3. Reducing the cost of acquisition and procession of materials by

   a. Reducing cost of buying i.e. reducing the administrative costs associated with securing material.

   b. Effective receiving, banding and storage operation.

4. Reducing the cost of being with out y providing for continuity of supply.[47]

2.11 Procedures of Inventory Management

The procedures of inventory management cover the activities such as purchasing receiving, storekeeping, issuing and pricing the inventory items.

1. **Meaning of Purchasing**

The process of inventory management in fact begins purchasing. The need for particular materials initiates purchasing in firm. Purchasing in narrow sense refer merely to the act of buying as items at a price and in border sense purchasing makes it a management activity that goes beyond

the simple act of buying and include the planning and policy activates, research and development service selection. Management suggests that purchasing decision involve the weighting of alternatives possibilities, and may of these alternatives involves the influence of other function on the purchasing decisions. A good purchasing management has played important role in the manufacturing companies. We should pay more attention in the purchasing of raw materials, supplies and equipment. We should purchase raw materials, supplies in the right quantity of the right quality form the right origin at the right time and cost. Purchases management should be effective otherwise it hamper in the quality of production. The production is hampered by scarcity of raw materials on time purchasing department should take greater responsibilities and should analysis the existing procurement policy and should tune with the overall organizational objective and policies. The efficiency of any business activity depends upon having materials, supplies and equipment available in proper price. We can improve management of purchases by the help of standardization, value analysis, maternal substitution, transportation saving and cost reduction of packing modification.

"In India approximately 60% of every rupee of manufacturing is spent on material and about 90% of net working capital of industry is tide up in inventory.[48]

"It has been observed that for a steel plant the cost converting raw materials into saleable products is only 8% while purchased materials, supplies and services accounts for 37%

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[47] Bajryacharya, P.M and Sherestha, D.K., *Production management*, Nutan Printing Press-1988. p14
[48] Alford and Betty, Principles of Martial Management, Pragati Prakashan, Meerul, 3rdEdition-1983.p 116

Purchasing is an operation of market exploration to procure goods and services of desired quality, quantity at lower price and in the desired times. Supplies who can provide standard items at the competitive price are selected purchasing in an enterprise haw now become a specialization faction. It was experienced that by giving the purchase responsibility to a specialist, the firm can obtain greater economics in purchasing.

Purchasing in simple sense is an act of buying something with money. But Industrial purchasing has a broader sense. "Purchasing is the procuring of material, tools and services required for the equipment maintenance and operation of a manufacturing."

Purchasing being a faction of material and inventory management is an important managerial activity purchasing is also a process.

J.H. Westing in his book "Purchasing management" express his idea as purchasing is a management activity that goes beyond the simple act of buying and includes the planning policy, objective covering wide range of related and complimentary required for the proper selection of materials and sources from which these materials may be brought.[49]

2. Role of Purchasing

Purchasing function in any organization is concerned with the cost of materials purchased. Therefore the purchasing agent has an important role in industry for purchasing" Purchasing which the only department that deals with both the materials and its cost should be recognized as the valve expert of the organization.[50]

[49] Wesing .J.H. purchasing Management, John Welly and Sons Inc., New York-1976, p5
[50] Genorg, N., Cost Reeducation, Institute of Cost and Works, Account , London, p23

"The purchasing agent in the organization is a very important person, and therefore he should be a man of quick decision, wide vision, good personality versatile, a good leader and clear foresight.

The purchasing function must be affective, because it is sometime concerned with receiving, inspection, and storage of materials. Therefore, "To be really effective this department must be an independent department directly responsible to the director in charge.[51]

In the very beginning, purchasing was considered as one the activity of the production management. But now it is regarded as a separate and impotent sphere of industrial management. The modern thinking is that purchasing is a separate branch of industrial for which closely works with other department for achieving common objective of maximizing profit."

3. Objective of Purchasing

In he word of L.N. Gupta, "The responsibility of the department is to biy materials of the right quality in the right quantity at the right price from the right source and with delivery at the right place. This is the way of starting the objectives of sound purchasing."

The following are the main objective of the purchasing:-

1) Procurement of required quality and quantity of materials at there best price not necessary the lowest price.

2) Procurement of materials, which best suit the product and the purpose for which they are intended.

[51] Gupta, I, N. Cost Account, Kitab Mahal 15 Jhron Hill Road Allahabad., p27

3) Purchasing for the time ultimately been a schedule sufficiently in advance of the demand of the production department so that the production work shall not suffer due to lack of material.

4) Buying the quantity which is neither too much that involves belonging of capital, nor too little that holds up the regular supply for production.

5) Improvement of product with reference to quality and the distribution by means of selection of adequate materials.

6) Maintaining continuity supply to insure production schedule at a leading to waste of materials and equipment.

7) Avoidance of duplication of materials, leading to west of materials, leading to waste of materials and equipment.

8) Maintenance of company competitive position is the market by the customer. Having company's quality standards in accordance with the demand of customer.

9) Creation of goodwill for the company through dealing with supplier

10) Developing, fullest co-operation and co-ordination and maintenance of internal relationship among various department of he company.

According to A.G. Pearson the prime objective of the purchasing organization is "Effective commitment of the company's fund" and having goods of the right quality, form right sources, at right price, at right quantity and time. Other objectives are listed below.

i. It is conducting purchase function so as to minimize or eliminate disruption in production resulting from lack of any materials equipment and supplies .

ii. It must be achieved with the minimum investment in reserve inventories.

iii. It is the maintenance of adequate standards of quality for items purchased.

iv. It is lowest ultimate cost rather than the lowest initial cost.

v. It is the avoidance of duplication, waste and obsolesces with respects to the various items purchased.

vi. It is the effective commitment of the company's funds.

vii. It is the economic success of the business organization.

viii. It is not so much produce the raw materials the lowest price but to reduce the cost of the final product.

Summarizing about insure the above objectives a larger number of parameters such as right price, right quality, right contractual terms, right time, sources, right materials, right place, right mode of transportation, right quantity and right attitude has to be considered jointly.

"The objective of the sound purchasing is avoidance of duplication. Waste and obsolesces to the various items purchased."[52]

A final objective of sound purchasing is the development of the internal relationship that leads to understanding and harmony among the various organizational units with he company."

The main objective of the purchasing should be uninterrupted and smooth production to provide regular service to the customers at the lowest possible cost.

4. *Types of Purchasing*

Purchasing is primarily a buying activity and therefore types of purchasing very with the purpose of buying. There are four types of buyers.

1) Industrial buyers
2) Buyers for wholesalers
3) Buyers of merchandise for retail stores.
4) Ultimate consumers buying form the retail stores.

Dr. Watte defines industrial purchasing as "The procurement by purchases of the proper materials machinery, equipment, and sup0pliers or stores used in the manufacturing of a product adapted to the marketing in the proper quantity and quality.

At the proper time and the lowest price consistent with quality desired. "Industrial buyers will purchase for conversion and make final product where as buyers for whole sealers and merchandise for retail stores aim at distribution or resale. Ultimate consumers, a large percentage has to go by a neceessity and the quantity purchased is small. The main activity of purchasing in terms of technique or scientific management rests with industrial buyers.

"In most organizations normally the consumption of materials angels between 60% to 70% of the cost products (sales value). These percentage very from industry to industry, e.g. in the mining industry. The consumption of materials production would be proportionally lesser then another production unit but all the same the supply function remains vital and important.

5. ***Principle of Purchasing***

Following are the some important principles of purchasing:

a. The acceptance of order is too specific and not implicit preferably, it should be a know ledged by either to sides before it is binding.

b. Ambiguity and misinterpretation should be avoided specially in respect of quality, delivery, services discount or any such changes.

c. The Indian sale of goods. Act lays down that of payment or specific provision is payment or any other stipulation as to time of payment or any other stipulation as to time being essence of contract, the same in not implied. It has to be stipulated.

d. The supplies take warranty of goods as per specification laid down in tender and not whether these are fit to intended use. If it is so required that detailed information have to be stipulated will in advance or troughs negotitation.

e. The other features are buyer's right to reject unwanted goods. Liquidation for damages, passing of ownership etc are covered in legal aspects.

6. ***Procurement Cycle***

The procurement function of any manufacturing organization is grouped i three categories.

a. Purchasing Cycle
b. Purchasing information flow
c. Purchasing transaction

a. ***Purchasing cycle***

b. Purchasing Information Flow

Under this function the following activities are performed.

i) ***Value Analysis***

Under this, the value of the material is analysis. Value analysis of any material makes organization able to find out the lowest cost o materials available. Value analysis of materials should include the transportation cost also.

ii) ***Product Specification***

Under this, activity of product specification, materials to be purchased are decided in terms of quality and quantity.

iii) ***Suppliers Selection***

Under this function, suppliers of materials are selected for branded and patented items there will be single supplier. But for most of the items

there will be a selected. The suppliers of the materials is to be selected depending upon the reasonability, price history, delivery record of the suppliers and other services rendered by the suppliers.

c. Purchasing Transactio

Under purchasing transaction three are various buying methods. Which are listed below:

a. ***Purchasing by Requirement***

Under this methods purchase are made only when required. This method is suitable for goods, which are not regularly purchased and not kept in stock.

b. **Market Purchasing**

Purchases made to take advantages of price changes are known as market purchasing. Such purchases result in lower purchases price. Greater margin of profit on finished goods and saving in purchasing expenses but sometime it is argued that such purchasing may not suit entirely the needs of production.

c. **Regular Buying**

This method result in low prices of material and delivery to meet schedule future requirements. This is a very scientific method of buying. This method ensure the organization of adequate suppliers and prevents excessive purchases as well as below the requirements.

d. **Purchasing with Special Order**

It can also be termed as contract purchasing. Under this method special order is placed to purchased the special goods required. A contract is

made with suppliers for the purchase of good regarding schedule of supplies, means of transportation and term of payment.

e. Speculative Purchasing

Under this method, purchasing are made in excess of needs at the time market price is low. This purchasing is low. This purchasing helps the company to save money in purchasing to increases income.

7) Receiving and Storekeeping

On the arrival of the consignment all detail relating to actual materials received should be entered in goods received note. After proper inspection quality control, good should be passed into store. The store function involves both keeping the store of materials and keeping the store records, the former being physical task and the later accounting task. The store are classified as centralized and decentralized store depending upon the nature and requirement of the organization.[53]

8) Issued and Pricing

Pricing the inventory is one the most interesting and widely matter in accounting process. Many organization are interested in the various methods of pricing inventory because it has a direct effect of income tax problem. One method of inventory valuation may lead lower tax liability than other inventory valuation method. There many methods of inventory valuation but most significant method is cost and other method is lower of cost or market. Both methods give different results.

[53] Agrawal, G.R. Dr. op cit. p18

Cost Basis for Inventory Valuation

"The primary basis of accounting for inventory is cost which has been defined generally as the price paid to considerate given to acquire an assets. As applied to inventories, cost means in principle the sum of the applicable expenditure and charges directly or indirectly incurred in bringing an article to its existing condition and location.[54]

Conceptually, The process of valuing the inventory is simple. We can calculate inventory value that multiplying physical quantity of goods by cost per unit. But in practice, many organizations purchases different types of raw materials ad different price and different time. Price of materials changes time to time. There are many types raw materials remaining the stock.

It is not always possible to identify the individual particular purchases group. AT that situation firms have faced difficulties in valuing the inventory. In this situation there are many methods which are based on historical cost used in determining the value of inventory are:

a. Specific Identification Method

The specific indemnification method requires that each unit in inventory be identified with the particular time it was purchased. In this method, the items have serial number or are distinguishable by model, color or size to identify the particular items but specific items separate at first and record in stock book. This method is more suitable to low volume high cost item such as automobiles. It is not very practical when

[54] American Institute of Certified Public Accountants, Accounting Research and Terminology Bulletins, Final Edition, New York-1961. 28

the firm purchases large quantity of identical units of various times and prices.

b. Weighted Average cost/End –of-the Month Methods

It assumes that goods are removed form the beginning inventory and purchases group in proportion to the number of units in these groups consequently: cost of the ending inventory also represents a proportional distribution from the beginning inventory and various purchases groups. The weighted average cost computed by dividing the total cost of goods available for sale for during the period.[55]

$$\text{Weighted Average} = \frac{Total\ \text{cost}\ goods\ Available\ \ for\ sale}{Total\ /\ units\ Available\ \ for\ sale}$$

This method is widely used by organization that hold item of inventory long period of time because it average out of the effects of price increases and decrease. In addition weighted averaging process is satisfactory when there are both increase and decrease in cost within the accounting period. Some organization uses this method which purchases the inventory items frequently interval because it doesn't require that the ending inventory cost be associated with any particular purchases group. A common criticism of the methods is that in attaches no more significance to current price then to price the prevailed several months earlier.

c. First in First Out (FIFO) Methods

FIFO method assumes that the oldest items on hand are sold first. Each sale is made out of the oldest goods in stock; the ending inventory

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[55] Laughin, E.J., Financial Management, Kansas State University, p440-444

therefore consists of the most recently acquired goods. During the period of rising prices this method will result in a larger amount being assigned as the cost of ending inventory then would be assigned under the average cost methods. FIFO is most commonly used method for valuing inventory. It is simple to use and appears to coincide with the established merchandising principle of selling the oldest items first.

d. Last In First out (LIFO) Method

This method assumes cost flow is exactly the opposite of FIFO method. The title of this method assumes that the cost of the items sold was attributable to the must recent item purchase. Consequently, the ending inventory consists of the oldest unit in hand. Cost of he latest purchase materials will be the cost assigned to the first material issued. Until they are exhausted then the price of the preceding lot is used and so on material are issued at costs approximating current market prices but inventories trend to valued at the oldest lots on hand giving a price which is out-of-date with current invoice prices.

d. Standard Cost Method

LIFO, FIFO and Average cost methods are often awkward to work within the subsidiary records for materials under a perpetual inventory system. for this standard cost method may be used in accounting for individual items in materials inventory.[56]

This method charges material unit into the factory at a predetermined a budgeted or estimated price reflecting a normal or an expected future price. Receipts and issues of materials are recorded in quantities only on

[56] Man Mohan, and Goyal, S.N., op cit. p 695-96

materials cared there by greatly simplifying the recorded keeping. Then, there is a basis for comparing existing cost from day to day. Which should exist under normal condition.

e. Base Stock Method

According to this method a certain constant quantity or base stock of material is assumed to be necessary to keep the concern going. The base is valued at he cost layers of materials in the inventory at close beyond the unit the base may be cost on the basis of FIFO, weighted average etc, method.

All the method has their advantage and disadvantage. However, the method chosen is significant for efficient inventory management especially in its financial dimension.

2.12 Structure of inventory management organization

In manufacturing organization i.e. Departments, corporations and companies engaged in manufacturing and sale of goods, there should be a full-fledged department dealing with materials management department may be divided into the following sections.[57]

a) Materials policy-marking, planning and program
b) Purchasing
c) Inventory control
d) Receiving
e) Warehousing

[57] Goyal, S.L., Modern Management Techniques, Completely revised and Enlarged Includes a Techniques Published by Deep and Deep Publications, f-159, Rajori Ganden, New Delhi-110027. p427

f) Store-keeping

g) Materials handling

h) Scrap and surplus disposal

2.13 Inventory Model

1. Periodic Review System

This system is sometimes called the constant cycle system. The system has the following characteristics.

i. Stock levels for all parts are reviewed at fixed intervals e.g. every fortnight.

ii. Where necessary a replenishment order issued.

iii. The quantity of the replenishment order is not a previously calculated EOQ, but is based upon the likely demand until the next review, the review, the present stock level and the lead-time.

iv) The replenishment order quantity seeks to bring stocks up to a predetermined level. The effect of the system is to order variable quantities at fixed intervals as compared with the recorder level system.

2. Replenishment Models

Replenishment models of base stock models are effective in many real inventories situations, particularly when stock counts are infrequent. This models also called maximum liability model. Inventor cost are not

considered explicitly in the replenishment system, and there is no fixed recorders quantity. Instead inventory is reviewed at periodic intervolves, and if there have been any sales since the last review, an order is placed. In this model, there is only one number to be determined, M. The base stock or maximum inventory level. Lets is the mean weekly demand. L is the mean lead-time in weeks. R is the inventory review the in weeks, and B just sufficient to meet average demands until the ordered goods arrived. We, therefore is the replenishment level is determined by the following formula.

$M = S\overline{w}(L + R) + B$

Depending on whether lead-time is greater or less then the review time. One of the following two rules is used for determining the reordered quantity (q) under the replenishment model:

q = M - IifL< R

q = M - I –TifL > R

Where,

I = Inventory at a review time (In units)

T = number of units in transit (previous orders which have not yet arrived)

The buffer stock B must be sufficient of guarantee an adequate service level in the face of variations in both demands and lead times. If we take the replenishment time as being the total of lead-time and review and have a measure of the distribution in demand over.

When lead times are long compared to review times, larger butter stocks are required then in the case where the reverse is true for long lead times (and particular for items which have a larger shortage costs), one finds replenishment models in which orders are placed when an items (or a number of items) is sold.

3. Inventory Models with Uncertainty

In simple inventory models we assume that demands and supply, lead times are constant in many real world applications demand can't be predicated with certainty and lead times often very. Form one order to another. A consequence of this variation is that stock outs may occur if future demand exceeds our estimate of if an order arrives later then expected. It is possible to reduce the risk of stock-outs by carrying larger investments called safety stocks or bugger stocks. However, additional costs are incurred by trying up additional funds in inventories and risking the possibility of obsolesces. The objectives then are to develop a model for determining inventory policy that balance these risks and minimizes expected total incremental costs.[58]

2.14 Inventory control

a) Concepts of Inventory Control

As the term inventory control have two functions, which are quite different but related to each other only in that they both required the maintenance of adequate records of inventories as well as receipt and issues. These functions control and operating control.

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i. Accounting control of inventories is concerned with the safeguarding of the under. Taking property in the form of raw materials, work-in-progress and semi finished products, and the proper recording of receipt and consumption of materials as well as flow of the goods through the plant into finished stock and eventually to customers.

ii. Operating control of inventories is concerned with maintaining inventories at the optimum level keeping in view the operational requirements and financial resources of the business.

Every organization holds inventory at necessary level. The under and over stocking of any inventory is evil for business. Therefore "inventory control may be defined as the planning ordering, and scheduling of materials used in the manufacturing process. It is possible to exercise control over the three types of inventories recognized by accountant i.e raw materials, work-in-process and finished goods.

" The technique of maintaining the size of the inventory at some desired level, keeping in view the best economic interest or an organization is known as inventory control.[59]

More specifically "the purpose of inventory control is the stock of an adequate balanced inventory of raw materials and to reduces storage and handling costs, obsolescence and deterioration costs, insurance and interest charges and risks of price level changes."

[59] Westing, J.H. op cit p 157

b) Objective of Inventory Control

Inventory control refers unit controls and value controls. Purchases and production managers have own interest in unit control with consequence that they think, requisition and order in terms of units Instead of money values. It is the course, control emphasis in on units. On the other hands financials managers are mainly concerned with control of inventories. They have to think resources invested in inventory will be efficiently and effectively utilizes.

A fundamental objective of a goods system of operating control of inventories is to be able to place at the right time from the right resources to acquire the right quality at right price and the right quantity. Overall objective of inventory control may be amplified into the following objectives. Which have to be kept in view while developing and maintaining a system of inventory control.

a. Service to customer
b. Effective use of capital
c. Economy in purchasing
d. Promotion of manufacturing efficiency

c) Basic Policy Decision of Inventory Control

The policy decision necessary to the development of in integrated inventory control systems are as follows:

i. Policy of service to customers.
ii. Availability to capital and store space.
iii. Nature of purchase policy.

iv. Type of purchasing policy.

The decisions on these points are not mutually exclusive but are intimately linked with one another. The majority of business, constrains competition set a certain minimum standard of service to customers while considerations of production impose a limit to the minimum size of purchases orders and processing lots. Non-speculative and speculative purchasing in always very thin and more so if either style is factor in business or volume fluctuation make it difficult to forecast sales accurately. Moreover, the company's overall financial policy determines to a very large extent the availability of capital for investment in inventories and as the former has to provide for flexibility to meet changing conditions. The latter has to be kept flexible.

d) Importance of Inventory Control

Investment in inventory represents in many cases, one of the longest assets items of business enterprise particularly those engaged in manufacturing wholesale and retail trade. as the ability to keep materials cost at a minimum in each unit of finished product is a significant factor in profitable operations of a business, the importance of inventory control through proper planning, purchasing, handling and accounting can't be over emphasized. The formulation and execution of sound inventory management policies must be managerial responsibility of the highest order. It is said that more firm's fail on their objectives due to inefficient inventory management. This is due to the fact the control of inventory has been on the must neglected problems of management.

The managerial objective must be the avoidance of over-investment and under-investment in inventories. A proposition, which appears to indicate

that there, must be some right amount of inventory investment for maximizing profits. It is most difficult to defect over-investment and under-investment in actual conditions. This therefore is the intractable problem involved in inventory management.[60]

2.15) Inventory Management Techniques

Adequate inventories facilitate smooth production activities and help to provide off shelf delivery to customers. ON the other hand excessive inventory is idle resource of the firm and can prove costly because it tries up working capital unnecessarily which could have been better used had it been utilized for some other purpose. According to Alton N. Smith" inventory is (money) on which of deviation. Non controlled inventory is an industrial danger." The major problem of inventory management. Therefore should be to arrive at an optimum balance between too much inventory and too little inventory. So the there may be no stock out problem and cost of inventory should be minimum. The following inventory management techniques may be helpful in this regard.[61]

a. Economic Order Quantity
b. Re-order level
c. Minimum level
d. Maximum level
e. Danger level
f. Perpetual Inventory System
g. Stock Control Through ABC Analysis
h. Inventory Report

[60] Man Mohan and Goyal, S,N. op cit. p670-71

"To manage its inventories effectively, a firm should use a systems approach inventory management. A system approach considers in a single model all the factors that affect the inventory. A system for effective inventory management involves sub-systems."[62]

a) Economic Order Quantity (EOQ)

This technique attempts to establish the more economic balance between acquisition cost and carrying cost by determining quantities to be ordered. the most economic quantity is ascertained at this point.

In 1915F.W.Harris, development the famous economic order quantity (EOQ) formula. Latter, through the consultant named Wilson, This formula gained wide use in industrial area. Later on this formula was development by Harries. The EOQ is still widely used in inventory for independent demand. The EOQ model is an inventory management technique used to find the optimal order includes order quantity the total which includes ordered and carrying cost.

John J. Hampton defines economic order quantity as "The order size that will result in the lowest total of order and carrying costs for an items of inventory. Further more he states the importance of economic order quantity as if a firm places unnecessary orders it will incur unneeded order costs. If is place to few orders, it must maintain large stock of goods and will have excessive carrying costs be calculating an economic an order quantity, the Identifies the number of units to order that results in the lowest total of these costs."[63]

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[61] Jain, S.P and Narang, K.L., op cit. p A-71
[62] Hampton, J.J. Financial Decision Making, Third Edition, June-1986, Printed By U.J. Batra at Pearl otfse press New Delhli-11015 and Published by Prentice-Hall of India Private Ltd., New Delhi. p233
[63] Hampton, J.J., Financial Decision Making, op cit, p233

H.N. Broom has also size that will results in the lowest total cost (total ordering cost+total carrying cost) for an item of inventory. If a firm placers many orders it will incur unneeded ordering costs. If it places too few orders, it will have excessive carrying costs in the lowest total costs. EOQ seeks that how much units of inventory should purchase at an order, which minimizes the total cost. When we are going to calculate EOQ one thing should keep in mind to calculate the cost involve in the carrying and ordering. a fairly larger error, say 21% in determining the carrying and ordering costs will introduce a much smaller error (10% in the determination of the EOQ.[64]

We can compute EOQ with the help of forecasting usage, ordering and carrying costs, In EOQ calculation, we must use marginal cost only, do not include fixed costs.

$$EOQ = Q^* \sqrt{\frac{2AO}{C}}$$

When,

A = Annual demand/Requirement/sales

D = the ordering cost per unit.

C = Carrying cost per unit

- EOQ with gradual replenishment.

The rate of replenishment and the rate of usage determine the net rate of replenishment during the period. To cope with such situation the basis formula of EOQ needs modification.

[64] Buchan, J. and Doenigsberg, E., Scientific Inventory Management, published by Prentice Hill of India Pvt. Itd. New Delhi-1970. p362

EOQ with gradual replenishment = $\sqrt{\frac{2CoD}{Cc\left(1-\frac{D}{R}\right)}}$

Where,

C_o = Ordering cost per order.

D = Demand per annum,

C_c = Carrying cost per item per annum

R = Production rate per annum i.e. the quantity that would be produced if production of the item was carried on the whole year.

Result will be larger/higher than the basic EOQ formula because the usage during the replenishment period has the effect of lowering the average stock holding cost.

- EOQ where stock outs are permitted

Overall objective of inventory control is to minimize the holding costs, ordering costs and stock out costs. Sock out costs are difficult to quantity but never the less may be significant and the avoidance of these costs is the main reason hi-stock are held in the first place.

EOQ with stock outs = $\sqrt{\frac{2CoD}{Cc}} \times \sqrt{\frac{Co+Cs}{Cs}}$

Where,

C_s = stock outs per item per annum

C_o = Ordering cost per ordered

D = Demand per annum

C_c =n Carrying cost per item per annum

1) Assumptions of Economic Order Quantity

The concept of EOQ is based on the following assumption :

a) The demand rate is constant recurring and known for example, demand (or usage) is 100 units a day with no random variation, and demand is assume to continue into the indefinite future.

b) The lead-time is constants and knows. The lead-time from order placement to order delivery is therefore always a fixed number of days. No stock –outs are allowed. Since demand and lead-time are constant one can determine exactly when to order material to avoid stock outs.

c) Material is ordered or produced in a lot is placed into inventory all at one time.

d) A specific cost structure is used as follows the unit cost is constant and no discounts are given inventory level there is a fixed ordering or setup cost for each lot which is impendent of the number of items in the lot.

e) The item is a single product there is no interaction with other products.

2) Approaches to Set EOQ

The EOQ model can be illustrated by (a) mathematical (short-cut) formula method (b) The long analytical approach or tabulation method or trail and Error Approach c) Graphical Approach, they are explained below.

i. Mathematical (short-cut)/ Formula Method

Mathematical models are also available to calculate economic order quantity. There are numerous models exit, as the filed of inventory management and can be studied in college programs such as operation research and production management. Every many mathematical model exists, the main objective of these model is to reduce minimizes the inventory cost/total costs.

With out getting into highly refined decision models we can illustrate the concepts of EOQ with a basis mathematical model. We can calculate EOQ by using the following formula:

$$EOQ = \sqrt{\frac{2AO}{C}}$$

Where,

A = Annual Demand/Requirement/ Sales
O = The ordering cost per unit
C = carrying cost per unit

ii. The long Analytical Approach or Trail and Error Approach

This is another approach to calculate economic order quantity. A firm has different alternative purchase policy of its inventory. It cans purchase its

entire requirement own one single lot. Alternately, the firm can purchase its inventory is small lots periodically say weekly, monthly, bio-monthly, sic-monthly and so as. Its means more then one time the firm can place an order to purchases inventory. The smaller the lot sizes the lower average inventory and visa-versa. Low inventory holding are associated with high ordering cost and low carrying cost. This approach for the determination of EOQ uses different permutations and combination of total cost inventory purchases so as to find out the total cost.

In other words, according to this approach the carrying and ordering cost for deferent size of order to purchases inventories computed and the order size with the lowest total cost/ ordering plus carrying of inventory is the economic order quantity.

iii. The Graphic Approach

The Economic order quantity can also be found graphically. The following figure illustrates th ons.

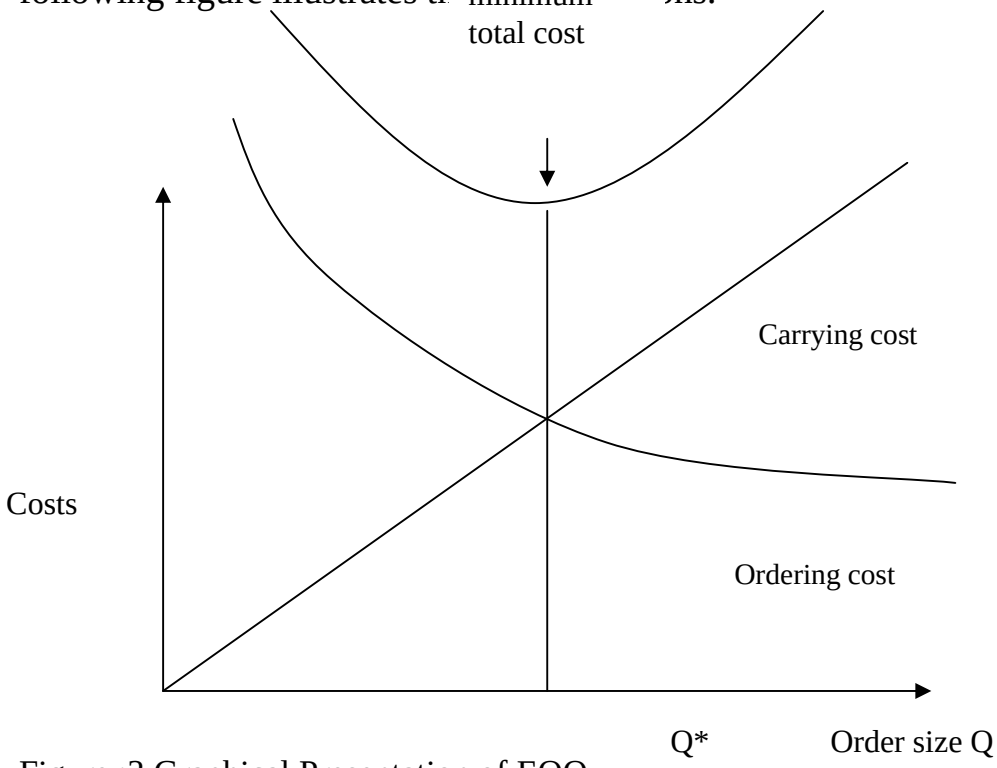

Figure :3 Graphical Presentation of EOQ

In figure carrying, ordering and total costs are plotted on vertical horizontal axis horizontal axis used to represent the order sizes. Total carrying cost increase as the order size increase. Because on an average a larger inventory level will be maintained and ordering cost decline with increase in order size. The behavior of total cost line noticeable since it is a sum of two types of costs that behave differently with order size. The total cost decline in the first stage but they start rising when the decrease in average ordering cost is more than offset by the increase in carrying cost.[65] The economic order quantity occurs at the point Q where the total cost is minimum if the order size increase carrying cost exceeds ordering cost that are saved. Thus, the firm operation profit is maximized at Q.

3. Quantity Discount

Quantity discount helps the firm will to increase its order size more then the EOQ level. It will reduce number of orders and increase the average inventory holding. When we accepts quantity costs. The net return is the differences between the resultant saving and additional carrying costs. It the net return is positive, the firm's order size should equal the quantity necessary to avail he discount. It negative order size should equal EOQ level.

b) Re-Order Point

An important question in any inventory management system is "when should an order for the purchase of an item be placed, so that the concern does not run out of goods. The recorder level provides the answer to this question.

[65] Pandery, I.M., op cit. p 762 (7th Revised Edition)

"It is the point at which. If stock to material in store approaches the stock-keeper should initiate the purchases requisition for fresh supplier of material. This level is fixed some where between the maximum and minimum level in such a way that the different of quantity of the materials between the re ordering level and the maximum level will be sufficient to meet the requirements of production up to the time the fresh supply to the materials is received.[66]

"Re-order point sub-system answers the important questions in any organization's inventory management the question is "when an order should be placed so that the firm does not run out of stock."[67]

"The reorder point is the level of inventory at which the firm places an order in the amount of the economic order quantity. If the firm places the order when the inventory reaches the re-order point, the new goods will arrive before the firm runs out of goods to sell." So determine the re-order point arrive before the firm runs out of goods to sell." So determine the re-order point under certainty. There are three information/assumptions are needs.

i) Usage role

This is the rate per day at which the item is consumed in production. It is expressed in units.

ii) Lead time

If refers the time normally between placing an order and receiving the delivery of inventory. Lead-time covers the time span from the point

[66] Jain, S.P. and Narang, K.L., op cit. p56

when a decision to place an order for the procurement of inventory is made to the actual receipt of the inventory by the firm . It is also called procurement time of inventory. It is expressed in days, weeks, Months.

iii. Safety Stock Level

1. ROP Under Certainty

The minimum level of ROP = lead Time × average usage. Here. Lead time is the time normally taken in replenishing inventory after the order has been placed this formula as taken under certainty condition i.e. usage and lead time do not fluctuate.

Re-order point = Lead Time × Average usage

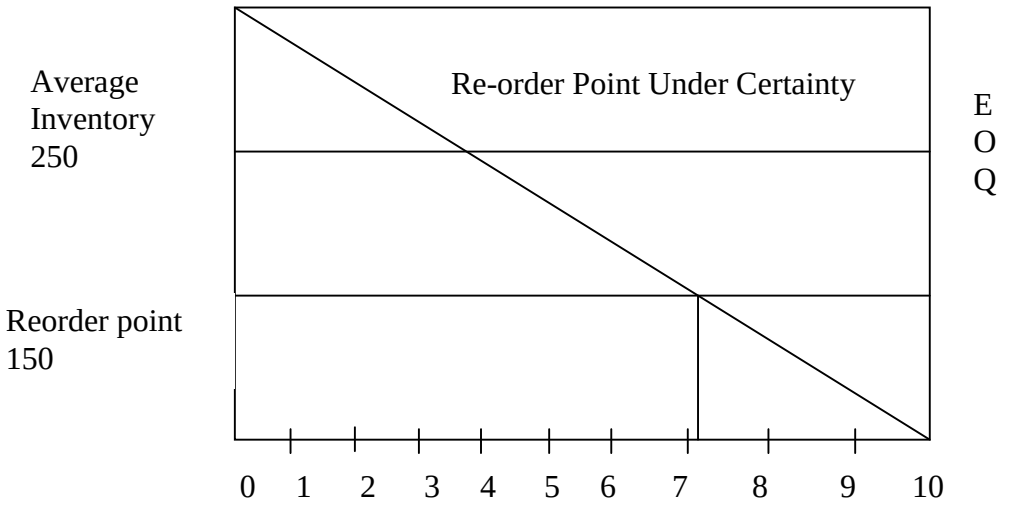

Figure :4 Re-order Point Under Certainty

Let us assume EOQ is 500 units, lead-time is 3 weeks and average usage is units per week. If no lead-time is considered. The new order will be

[67] Hampton, J.J., op cit. 235

placed are end of 10^{th} week i.e when EOQ reaches Zero level. If we know lead-time the new order should be placed at the end of 7^{th} week. We can calculate ROL = Lead time × Average usage = 3 weeks × 50 units = 150 units. It means 150 units left to consume during the 3 weeks lead-time. Figure shows that ROP will be placed at the end of 7^{th} we don't consider lead-time. The ROP will be the zero level of inventory.

2) ROP with Uncertainty

We can't predict lead-time and usage accurately. the demand for materials fluctuates day to day and delivery time may be varies. If the actual usage increase or delivery time is delayed. The firm can face stock out problem. To solve the stock out problem, the firm should maintain safety stock (buffer stock). Let us take on example.

Assume firm's stock out is 25 units per week. The firm should maintain a safety stock of 75 units (25 units × 3 weeks). Thus the ROP will be 150 units × 75 units = 225 units.

Re-ordering level can calculate by applying the following formula :-

ROP = (Lead time × average usage) + safety stock

Ordering level = Minimum level + consumption during the time required to get fresh delivery

Re-ordering level = maximum consumption × maximum re-order period.

Hence, maximum re-order period means the maximum period taken to get the materials once, the maximum period and maximum consumption during that period so that production or sale of goods is not held up due to shortage of any item of inventory.

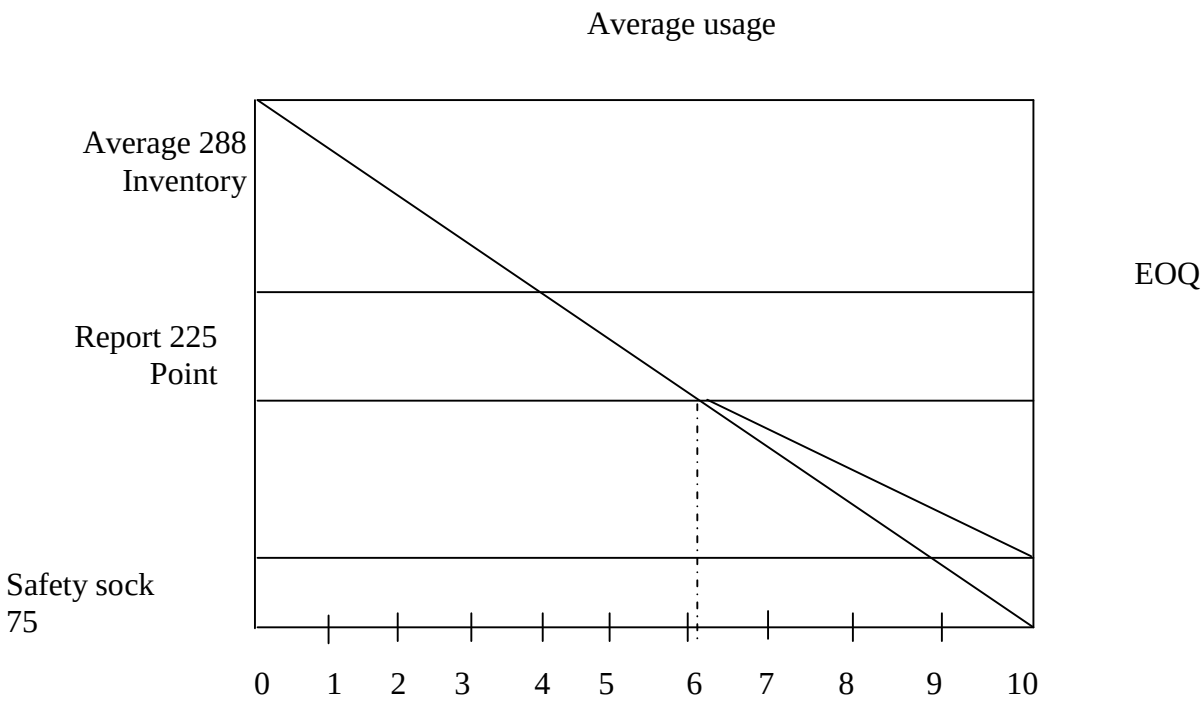

Figure : 5 Re order Point Under Uncertainty

3)Multiple Re-Order Point

We have thus for considered the re order point as having a single specific value but this is not only possibility. When the standard deviation of demand in the lead-time is large, say larger then the mean demand in the lead time, we may frequently have a situation such as that shown in previous. After receipts of the second order point A. The inventory level is still below the recorder point P. We recognize that the inventory falls below P-Q a second order must be placed if we are to attain a safe inventory level even after the receipts of both outstanding order should be inventory level fall yet further to below P-2Q, a third order would be necessary.

Lot size policy with large Demand in the lead times .

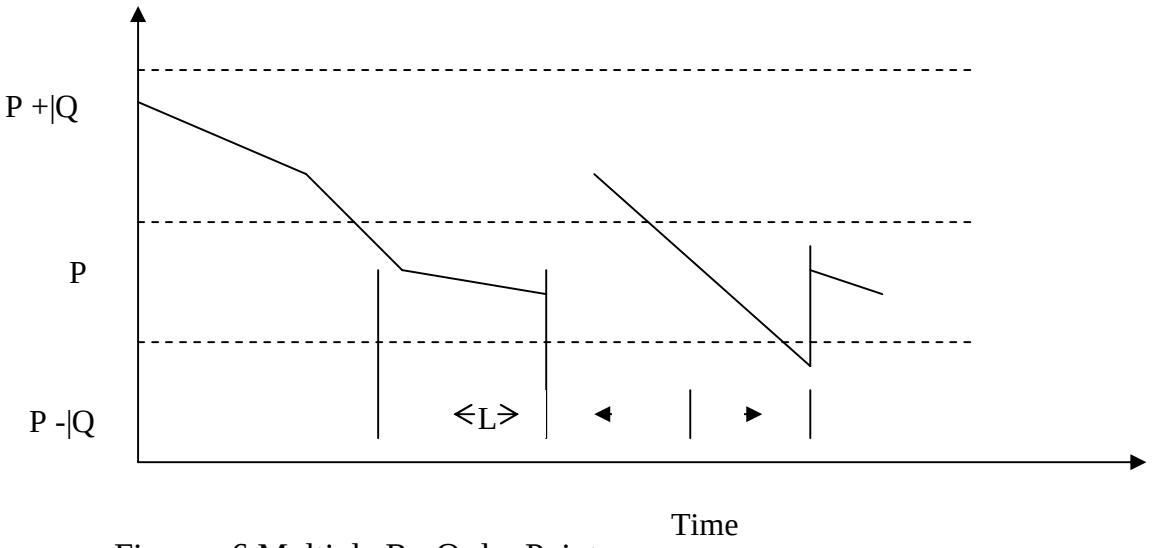

Figure : 6 Multiple Re-Order Point

Such a policy can be arrived from the lot size policy (Q,P), optimal replenishment. One can obtain the multiple reorder be placed whenever the sum of inventory on hand plus inventory on order (and not yet deliver) is less than the recorder point P. Using the fixed lot size formulas we can define recorder points at P, P=Q, P-2Q etc.

$$Q = \sqrt{\frac{2SCo}{CuI}}$$

and $P = B + S\bar{c}$

Where,

Q = Fixes lot size

S = Annual sales in units

C_o = Cost of placing an order

C_u = Unit cost of an item

I = Cost of carrying inventory in percent per year

P = Re order point

$S\bar{c}$ = Average demand during the lead time

B = Buffer stock

Similarly, one can define re order point at P, 2P-M, 3P-2M, etc for the optional replenishment (M,P) policy. Alternatively, one can consider a multiple or order policy initially and define it is such a way that both P and Q are determined from a single equation. Such a formulation has indeed been developed for use in military inventories, which are frequently characterized by larger standard deviations of demand. This policy was used for a paper wholesaler.

c. Maximum Level

Maximum level represents the mix mum quantity of an item of inventory that can behold in stock at any time that stock should not exceed this quantity. The quantity is fixed so that there may be no over stocking. The maximum stock level is fixed by taking into account the following factors.

a. Amount of capital available for maintaining stores

b. Godam space available.

c. Maximum requirement of the stores for production purposes at any point of time.

d. Rate of consumption of the material during the lead-time.

e. The time lag between indenting and receiving of the inventory.

f. Possibility of loss in stores by deteriorations, evaporation, etc.

g. Fluctuation in price :For instance, if there is the possibility of a substantial increases in stock level will be fixed. On the other hand if there is the possibility of decrease in prices in the near future, stock are kept at a very reduced level.

h. The seasonal nature of supply of inventory some items of inventory goods are available only during specific periods of the year. So the have to be stocked heavily during these periods.

i. Restrictions imposed by Governmental or local authority in require to material in which there are inherent risks, e.g, fire and explosion.

j. Possibility of change in fashion and habit, which will necessitate change in requirements of materials.

The formula of maximum stock level= Recorder level + Reordering

quantity –(minimum consumption × minimum reordering period)

d. Minimum Level

It represent the minimum quantity of inventory, which must be maintained in hand at any time. This quantity is fixed so that production as sale may not be held up due to shortage of the inventory. In this level. The following factors are taken into consideration.

1. Lead-time i.e. time lag between indenting and receiving of the inventory. It is the time required replenishing the supply.

2. Rate of consumption of the inventory during the lead-time.

3. Nature of inventory, minimum level is not requires in case of a special inventory, which is required against customer's specific orders.

Formula for the calculation of minimum level = re-ordering level-(Normal consumption × normal re order period)

e. Danger Level

This is a level of which normal issue of the material are stopped and issued are made only under specific instructions. The firms will make special arrangement to get the materials, which reach at their danger levels so that the production may not stop due to shortage of materials.

Danger level = Average Consumption × maximum re order period.

f. Perpetual Inventory System

The Chartered Institute of Management Accounts, London defines the perpetual inventory as "a system of recorded maintained by the controlling department, which reflects the physical movements of stocks and their current balance." Thus this is a method of as curtaining balance after every receipt and issue of materials. It means the system of records. Continuous stock taking is a physical checking to ensure the accuracy of perpetual inventory system.

It is based on recorded. It requires a lot of recording thus it is expensive also. This system is adopted in big concerns. It helps to make the financial statement as shorter interval. The perpetual inventory system is

intended as on aid to inventory control because the balance of stock shown by bin cards or stock should agree with balance as curtained by physical checking.

The operation of the perpetual inventory system may be outlined as follows:

I. The stock records are maintained and up-to-date posting of transactions are made there in so that current balance may be known at any time.

II. Different sections of the store are taken up by rotation for physical sticking.

III. Stores received but a waiting inspection are not mixed up with regular stores at the time of physical verification because entries relating to such stores have not yet been made in the stock records.

IV. Notice of the particular items to be verified each day.

V. The physical stock available in the store, after counting, weighting, measuring or listing, as the case may be is properly recorded by any of the following three methods:

a. Record in bin cards

b. Inventory tags

c. Stock verification sheets

g. ABC Analysis

Manufacturing organization finds it useful to divide material into three categories for the purpose of exercising selective control on materials. An analysis of the materials costs will show that a smaller percentage of items of materials in the store may contribute to a large percentage of the value of consumption and on the other hand a large percentage of items may represent a smaller percentage of the value of items consumed between these two extremes will fall those items the percentage number of which is more or less equal to their value of consumption items falling in the first category are treated as 'A' items of the second category as 'B' items and items of the third category are taken as 'C' items. Such an analysis of material is known as ABC analysis. This technique of stock control is also known as stock control according to value method or always better control method or proportional parts value analysis methods. Thus, under this techniques of material controls. Materials are listed in 'A', 'B' and 'C' categories in descending order based on money value of consumption. ABC analysis measures the cost significant of each item of material. It concentrates on important items, so it also knows as "control by Importance are exception" (CIE).

The report of the India productivity team on "stores and inventory control in USA, Japans and West Germany" gives the following example of ABC analysis.

Group	Percentage of items	percentage of costs
A	8%	75%
B	25%	20%
C	67%	5%

The significance of this analysis is that a very close control is exercised over the items of 'A' group which account for a high percentage of costs while less stringent control is adequate for categories 'B' and very little control would sufficient for category 'C' items.

The graphical representation of ABC Analysis mat be as given below :

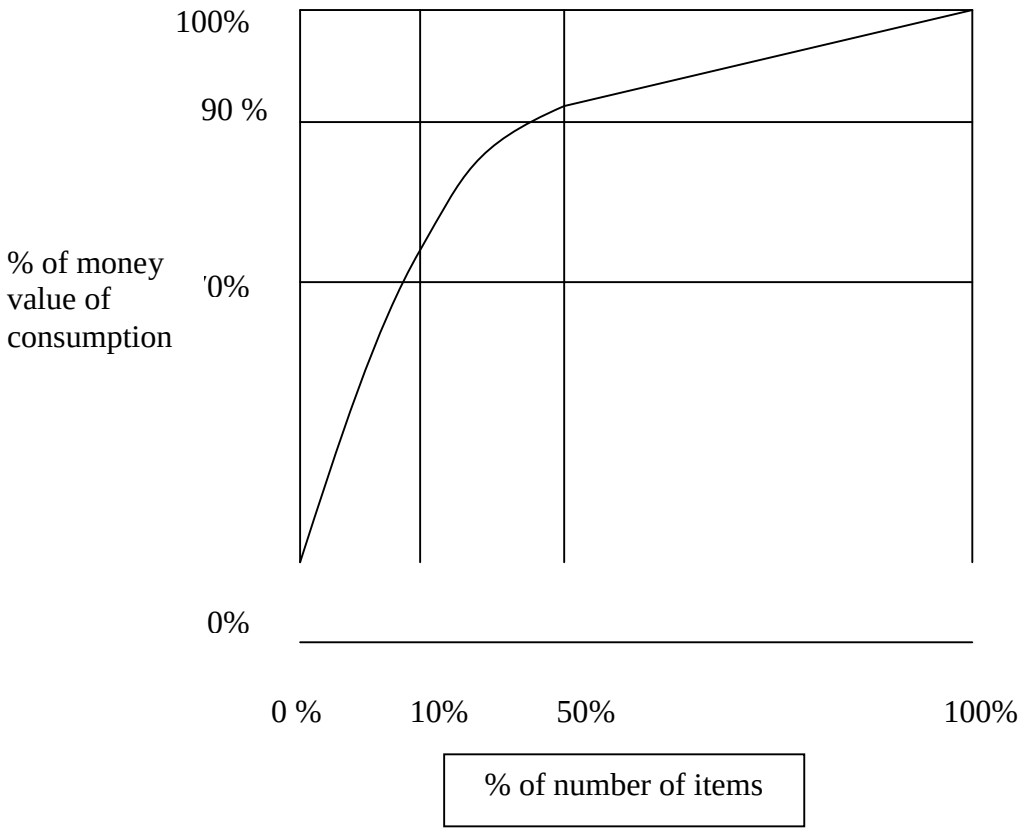

Figure: 7 Graphical Presentation of ABC Analysis

Procedure :-

The steps computing ABC analysis are :

a) First we calculate annual usage, multiplying the quantity (number of the units) of the item consume in one year by its unit price.

b) Arranging all inventory items, first items will show maximum annual usage in rupees, the second item the second maximum, the third item the third maximum and so on. After having done this total of annual usage in rupees is put at the bottom of the list.

c) Inventory items are categorized on the basis of annual usage and its price, which item has more annual usage and higher its price these item is categorized as 'A' item which contribute lesser then categories. This should be kept in categories 'B' and the rest contribution of the total percentage of annual usage is called 'C' categories.

d) Placing of the orders on the basis this classified.

h. VED Analysis

VED-Vital, Essential and Desirable analysis is used primarily for control of spare parts. The spare parts can be divided into three categories-Vital, Essential or Desirable- keeping in view the critically to production. The spares, the stock-out of which even for a short time will stop production for quite some time and where the cost of stock-out is very high are known as vital spares. The spares, the absence of which cannot be

tolerated for more than a few hours or a day and cost of lost production are high and which are essential for the production to continue are known as essential spares. The desirable spares are those spares, which are needed, but their absence for even a week or so will not lead to stoppage of production. Some spares. Though negligible in monetary value, may be vital for the production to continue and required constant attention . Such spares may not receive the attention they deserve if they are maintained according to ABC analysis because their value of consumption is small. So in their cases, VED analysis is made to get the effective results.[68]

i. Inventory Reports

The objective of inventory reports is to help the management in exercising effective inventory control take appropriate. It mans communication. But it is difficult to give the design of inventory reports. Which will be suitable for all organization. The design of the reports should be according to the individual requirements of the organization. An inventory report is as following :-

[68] Goel, S.L., op cit. p433

Frequently	File of Report	Sent to	Contents	Purpose of the Report
Weekly	Material usage and waste report	Works manager	Actual quantity of materials used against standard quantity specified	Controlling used of elimination of excessive wastage, scrap, spoilage and detectives
Monthly	Material price variance	Purchases officer	Comparison of actual prices of materials with standard price of material for quantity purchased	Watching efficiency of the purchase department and trend a price movements
Monthly	Purchasing report	Purchases committee	comparison of actual purchase consumption and stock figures	Determining the result of the policies decided upon
Special	Inventory	Top	A study of	Controlling

	report	management	show moving stocks dormant stocks and absolute stock	storage of materials
Special	Physical verification report	Storekeeper	Discrepancy between physical and book balance	Controlling storage of materials.
Special	Materials shortage report	Top management	Cost of idleness due to stoppage of production for want of materials.	Avoiding stoppage of production due to shortage of material

2.16 Function Viewpoints with respect to Inventory Management

Conflicting viewpoints concerning appropriate Inventory Management commonly exists with in the business firm. The functional are generally involved is Finance, Marketing, Manufacturing, and purchasing each area views inventory levels in light of its own objectives.[69]

a) **Finance**

The financial manager's basis responsibility is to make sure that the firm's cash flows are managed efficiently. The financial manager must monitor

the levels of all assets. In light of this overall objectives making sure that the firm does not tie up its funds in redundant or excess assets. Inventory, which typically involves a size able investment by the firm, must be scrutinized closely. The financial manager's general disposition to ward inventory levels is to keep then low there by keeping down the amount of money that must be tied up in inventory. The financial manager must police the inventories making sure that the firm's money is not being unwisely invested in excess inventory.

b) Marketing

The marketing manager's is concerned with the level of finished-good inventories. He or she would like to have larger inventories of each of the firm's finished products. This would ensure that all order could be filled quickly and eliminate the need for backorders due to stocks out. Since the marketing department's effectiveness is typically evaluated and sales forces often compensated. On the basis of the dollar volume of sales generated. These, People want to make sure that no sales are lost because a product cannot be quickly delivered to a customer. Carrying high inventoried should reduce the probability of lost sales due to sock outs.

[69] Gitman, L.J. Principle of management Finance, Third Edition, Published by Harper and Row Publisher. New York Cambridge, Philadelphia, An Francisco, London, Mexico City. (1988). p316

c) Manufacturing

The manufacturing manager main concern is with the level of the raw materials and work-in progress inventories his or her actions with respect to these inventories directly affect the level of finished goods inventories. The manufacturing manager's major responsibility if to make sure that the production plan is correctly implemented and that is result in the desired amount of finished goods. The manufacturing manager is evaluated not only on the basis of the efficient delivery of finished goods but also on keeping the production cost per unit low. In fulfilling his or her role the manufacturing manager would keep high raw materials inventory in order to avoid production delays and cause high finished goods inventories by making larger production runs in order to lower units production costs**.**

d) Purchasing

The purchasing manager is concerned solely with the raw materials inventories. He or she has the responsibly for seeing that the raw materials required by production are available in the current quantities at the desired times. The purchasing manager is concerned not only with the size and timing of raw material purchases but also with buying such materials at a favorable price. Since raw material costs are an important components of the estimate product cost, on the basis of which pricing decisions may be made. It is important for the purchasing managers may purchase larger quantities than are proper control. The purchasing receive quantities discounts or in anticipation of rising prices or a shortage of a certain material.

Part Second

Review of Selected Studies

Inventory management is a wide subject but no one pay attention in this field. Many modern techniques to control inventory management have been realized still many problems difficulties have faced by the manufacturing company. In Nepal there are many public enterprises have been established. any analysis has been made but only the aspect of financial performance. a few researchers made the research in inventory management of manufacturing company. Among them some selected are reviewed.

From the company's information it was found that no one has made research on inventory managemnt of Sitaram Gokul Milks (Kathmandu) Ltd. Kirtipur, Kathmandu Nepal. So these studies has own importance.

" Mr. Ram Kumar Shrestha has studies on Inventory management of Nepal Lube Oil (NCO) Limited in February 2002". To highlight in the aspect of effect on cost and profit due to inventory management to find out which techniques were used to control inventory system in the corporation, how much inputs are maintained and how many times the corporation places an order. In the same way Mr. Surendra Shrestha has studied on "Inventory Management, A case study of Gorkhapatra Corporation" in 1988.

They have used both primary and secondary data. The tools that were applied are interview, personal observation. Similarly different published and unpublished materials report, financial statement i.e. balance sheets, P/L accounts etc. were consulted by them.

They further use to analysis purpose ABC analysis, EOQ Model, Re-order point approaches were employed in financial tools. He concluded that the poor situation of procedure of re-ordering stock out. No techniques of inventory management are applied to calculate buying decision finally the tentative solution has been made for how much to buy and when to buy for maintaining proper level of inventory of the corporation and also the collection procedure of raw-materials. Material consumption, comparison between profit and production and present inventory position.

CHAPTER III

RESEARCH METHODOLOGY

In the previous chapter the introduction, related literatures were reviewed for the purpose of this study. In this chapter, the research methodology present the plan procedure and tools used to analyze and interpret the available data.

Research methodology is the way to solve systematically about the research problem.[70] It is the process of aiming at the solution of problems through the planned and systematic dealing with collection, analysis and interpretation of fact and figures. The major objective of this study is to analyze the inventory management of SGML.

For the purpose of achieving the objectives, the following methodology has been adopted which includes research design, population and sample, nature of data, data gathering procedure and presentation and analysis techniques.

3.1 Research design

The Formidable problem that follows in the task of defining the research is the preparation of the research project, popularly known as research design.[71] The research design is the plan structure and strategy for investigation of the facts in order to arrive at conclusion. The plan is the overall scheme of program of research. Its includes and outlines of what the investigator will do from writing the

[70] Khothari, C.R. Research Methodology, Methods and Analysis Hilly Eastern Ltd. New Delhi 1998 P.22
[71] Pathak, J.R. Management dynamics Two 1982p. 221.

analysis and their operational implication to the financial of data.[72] This research design is plan to obtain the answer of research question through analysis of data. Research is systematic search for knowledge. It applies scientific methods to the study of universe.

This study entitles 'Inventory Management of SGML' deals with procedure sales and distribution procedure, trends of inventory management of SGML, which were the variables under the study, so the analytical and descriptive research have been applied as research design.

3.2 Population and Sample

There are large numbers of manufacturing companies in Nepal but only one company SGML has been selected for this study purpose.

3.3 Data Collection Procedure

In order to collect the primary and secondary data the research had to visit the factory and different libraries. The secondary data means that type of data, which are a already been collected by other agencies, or persons, which the data were collected are as for follows.

I) Primary data

through inquires.

informal talk.

Interview with officers and non-officers

[72] Wolf Howard K. and Pant, prem R. Social Science Research and Technical Writing. Sewa printing press.

II) Secondary data

- Periodicals bulletins
- Journals reports
- published as well as unpublished document
- previous study and reports

3.4 Data Processing Procedure

First financial statement i.e. balance sheet and profit and loss. accounts, stock verification sheet and other related data were collected from available sources. All the information were grouped at one place and analyzed thoroughly. To judge this information/data, economy survey, report of Administrative managers and informal talk interviews were made properly then data organized, classified rearrangement and summarized and presented in the suitable table. Forms and graphs so as to make analysis easy.

3.5 Data Analysis Tools

The processed data were analyzed according to the objective of the study for to achieve the objectives. Required statistical tools and non-statistical tools were used to analyze the data. Through out the study the percentage and index were used in the most of the places of the study. Further the, relation between depended and undefended variable were made with the help to co-efficient of co-relation and tested with help of hypothesis testing and financial tools, turn over ratio, ratio analysis and statistical tools.

3.6 Limitations Of The Methodology

Every methodology has some limitation. The study will be carried in a range of latest five fiscal years. This study is only related to the area of inventory management. There for it will be not applicable in general situation. Certain topic has been analysis by rule of methodology. This makes easy to analysis. But it is not suitable in every where limitation gives trouble to find out fact objectives.

Besides the importance of methodology in every field. It has some limitation. The following are the main limitation.

i) Ignores study of qualitative phenomena

ii) Absence of universal/standard

iii) Ignores price level change

iv) Historical analysis

v) Absence of suitable, reliable and adequate data

vi) Data cannot easily be obtained.

3.7 Review Of Related Studies

In this study of inventory management of this SGML. Yet not any MBS students studies in this topics on in this Organization. Many analyses have been made on this organization but only the different topics. A few researchers made the research in inventory management of different business organization. This related dissertations are reviewed . Utilized method to analysis the data are given as follows.

Mr. Surendra Shrestha has utilized the following tools .

ABC analysis .

EOQ models

Inventory turnover ratio

Raw material turnover ratio.

Mean, SD and regression analysis.

Mr. Ram Kumar Shrestha has utilized the following tools and techniques.

ABC analysis

EOQ models

No of order sizes

Ratio analysis.

Statistical tools

The Various researchers utilize the above mentioned tools and the various researchers, which are most necessary to analysis the data collection, utilize techniques.

CHAPTER IV

DATA PRESENTATION AND ANALYSIS

The data presentation and analysis is the main portion of the study because all the information and ideas will be analyzed in this chapter. In this regard, Inventory control techniques imply to control inventor of SGML. There are many techniques to control the inventory management. These techniques are as follows.

4.1 ABC Analysis

ABC analysis is a widely used classification technique to identify various items of inventory for the purpose of inventory control. This analysis is important that a firm should not exercise the same degree of control on all types of inventory. We have to classify all types of raw material on the basis of nature and involve the investment and importance of it. In this analysis we have categories A, B. and C class. Generally group A involve the largest investment therefore we have to apply most rigorous and sophisticated inventory control. Group 'C' involves relatively small investment although the items of this inventory may large. So we give less attention to control the inventory management. The group B stand midway. It deserves less attention than A but more than C.

In ABC analysis firstly we have to plan properly of all inventories items into 3 categories.

In the context of SGML three groups of raw material are classified as follows:

Low but not exact A $\longleftrightarrow$ Milk $\longleftrightarrow$ 80% of total value.

Middle but not exact B $\longleftrightarrow$ Additive (Chemical) $\longleftrightarrow$ 12% of total value

High but not exact C $\longleftrightarrow$ Packing materials $\longleftrightarrow$ 8% of the total value.

"According to company collection department of SGML who available this data."

From the above data available group A is most important in terms of investment. Which is 80% and nature. But group C holds more quantity but lower value of total inventory. The items of B group hold middle investment and quantity also lies in middle. Lesser attention is given to category. C.

The ABC analysis of classification of various items of inventory for determining degree of inventory control efforts is very useful technique. It should however an item of inventory may be very cheap under ABC analysis cheapest items have given less attention. But it is very critical in the production process to give importance on any kind of inventories. In the production process in C category inventories we should give more attention in such inventories. This is a limitation of ABC analysis.

Such division reflects we should not give same types of efforts to control to control the inventory management. First priority we have to given such items of inventory in which have invested more money and the main inventory for the purpose of production, which material do no available easily and no enough sources or it is difficult to supply. In this regard, three categorized of Raw materials have been used by SGML. But in calculation main problem is classified inventory because some hold Kg. Some litres, some packet, some cup and some pot.

Procedure

1. First we calculate annual usage, multiplying the quantity (number of units) of the item consumable in one year by its unit price.

2. Arranging all inventory items, first item will show maximum annual usage in rupees, the second item the second maximum, the third item the third maximum and so on. After having done this total of annual usage in rupees, is put at the bottom of the list.

3. Inventory items are categorized on the basis of annual usage and its price. Which item has more annual usage and higher its price, these item is categorized as A Item which contribute lesser than categories A this should be kept in categories B and the rest contribution of the total percentage of annual usage are called C categories.

4. Placing of the orders on the basis of this classification.

4.2 VED analysis

VED analysis is used for spare parts inventory. In regards of SGML packing materials are analysed by using VED analysis. Absence of those items work/production will not stop for some days. This types of analysis helps in deciding on the confidence level.

Vital items must be available in stock when demanded Essential items should be available in stock. Desirable may or may not be stocked.

According to the company's available data.

Group A: Milk packing

Group B: Additives (Chemical) packing

Group C: Packing Materials

4.3 EOQ Model

To calculate EOQ only one raw material (milk) are considered. But SGML has used three types of raw materials, which includes milk, additive and packing materials. To calculate the EOQ of additive is difficult. Because this material is collected through annual tender method and tender holder's delivered this items in project so calculation of ordering and carrying cost be difficult and also company available this data on the basis of tender price not in quantity. And also to calculate the EOQ of packing material is difficult. Packing material includes many types of materials which we measure different units/ variable such as PCS, Big, small, Litres, Cup, Kg. packet, Jar, Ting etc. So, we can't measure all of these things in a single unit. So it is difficult therefore in this study period we do not involve additives and packing materials with respect to EOQ.

4.3.1 EOQ determination of Milk.

a) **For Fiscal year 2060/061**

On the basis of the project's record, the following data are available.

I) Mathematical/Formula method

Total ordering cost; Rs. 1,10,50,050

No. of orders : 362 times

Ordering cost per order (o): Rs. 30,525

Carrying cost per litres © = 1.00

Annual Demand/ Consumption (A) = 1,11, 84,000 liters

Applying Formula,

$$EOQ = \sqrt{\frac{2AO}{C}}$$

$$= \sqrt{\frac{2 \times 11184{,}000 \times 30{,}525}{1.00}}$$

= 826306.96 litres.

Here,

By multiplying A (11184,000) and O (Rs. 30,525) with 2 and dividing 1.00 and taking square of this figure, the result comes 826306.96 litres.

ii) Trial and Error Method/Tabulation Method/ Optimum Level inventory model.

In this method we should choose the total least inventory cost and in which order size total inventory cost will minimize at that order size will be the economic order quantity. We can calculate the economic order quantity by trial and error method also (Table No. 2) To calculate EOQ by Trial and Error method we have to develop the following formula.

$$\text{No of order size} = \frac{Annual\ Demand}{EOQ}$$

$$= \frac{11184000}{823606.96}$$

= 13 times

Total carrying cost = Average Inventory × Carrying cost per unit

Total cost = Carrying cost + Ordering cost

Order Size = $\frac{Annual\ Demand}{No.of\ order}$

Average Inventory = $\frac{Order\ size}{2}$

Table: 2

Calculation of EOQ

No. of Order	Order size	Average Inventory	Ordering Cost	Carrying cost	Total Cost
5	2236800	1118400	152625	1118400	1271025
10	1118400	559200	305250	559200	864450
13	860307.69	430153.84	396825	430153.84	826978.84
15	7,45,600	372800	457875	372800	830675
362	30895.02	15447.51	11050050	15447.51	11065497.51

Source SGML

From the tabulation method, it is clear that the lowest total inventory cost is Rs. 826978.84 which includes total ordering cost of Rs. 396825 and total carrying cost of Rs. 430153.84 and it takes 13 times in a year. In other words when we place order 13 times in a year there will be total cost minimizes. From the tabulation method, the optimum no of order should place 13 times in a year but the company have placed an order with 362 times which involves total inventory cost Rs. 11065497.51. According to the company, it had placed an order in every day because company need daily fresh material (milk) to provide consumer good fresh product.

If we order 10 times in a year results carrying cost of Rs. 559200 and ordering cost of Rs. 305250 and makes total inventory cost of Rs. 864450 which is greater than Rs. 826978.84. So it is clear that when we place an order 10 times in a year, total inventory cost will raises. If we order 15 times in a year results carrying cost of 3,72,800 and ordering cost of Rs. 4,57,875 and makes total inventory cost of Rs. 830675 which is greater than Rs. 826978. 84. So it is clear that when we place an order 15 times in a year, total inventory cost will raises. When we order size different than 13 times it arises the total inventory cost higher than 13 times. When the carrying and ordering costs are likely same or equal to it at that point the total inventory costs will minimizes. In inventory management, two cost i.e. carrying and ordering costs play an important role. These costs move opposite direction i.e. when carrying cost decrease, the ordering cost will rise and vice versa.

So we have to think how many quantity we purchase at a time and in what conditions that total inventory cost will reduce. When we place an order extra or when we place more order the total ordering cost will be increasing but carrying cost decreases. It is continuous process that ordering cost increase and carrying cost decrease with the number of order placed lastly, one point has come when total ordering and carrying cost will equal to each other. At that point total inventory management cost will minimum. It is clear from the tabulation method. When we place an order 13 times in a year, there is minimum cost. Except of 13 no of order, other ordering number will not support that minimizes the total inventory costs.

b) **For Fiscal year 2061/062**

On the basis of the projects record, the following data are available.

i) Mathematical/Formula method.

Total ordering cost: Rs 1,08,60,000

No. of orders = 362 times

Ordering cost per order (O) = Rs. 30,000

Carrying cost per litres © = Rs. 0.95

Annual Demand/Consumption (A) = 11,000,000 litres

Applying Formula,

$$EOQ = \sqrt{\frac{2AO}{C}}$$

$$= \sqrt{\frac{2 \times 11000000 \times 30{,}000}{0.95}}$$

= 833508.75 litres

Here, By multiplying A (11000000 litres) and 0 (Rs30,000) with 2 and dividing 0.95 and taking square of this figure, the result comes 833508.7535 liters.

ii) Trial and Error Method/Tabulation Method/Optimum level Inventory model.

iii) we have been used formula to determine the no. of order size. And that order size where total inventory cost will be minimize, will be the economic order quantity in Trial and Error Mehtod. (Table NO. 3)

$$\text{No of order size} = \frac{Annual\ Demand}{EOQ}$$

$$= \frac{11000000}{833508.75}$$

= 13 times

Total carrying cost= Average Inventory × carrying cost per unit

Total cost = carrying cost + Ordering cost

Order size = $\frac{Annual\ Demand}{No.of\ order}$

Average Inventory = $\frac{Order\ size}{2}$

Table 3

Calculation of EOQ

No.of order	Order size	Average Inventory	Ordering cost	Carrying cost	Total Cost
5	22,00,000	11,00,000	1,50,000	10,45,000	11,95,000
10	11,00,000	5,50,000	3,00,000	5,22,500	8,22,500
13	846153.85	423076.92	390,000	401,923	7,91,923
14	785714.29	392857.14	420,000	373214.29	7,93,214.29
20	5,50,000	2,75,000	6,00,000	2,61,250	8,61,250
362	30386.74	15,193.37	10860000	14,433.70	10874433.7

c) For Fiscal year 2062/63

On the basis of the projects' record, the following data are available.

i) Mathematical/Formula method

Total ordering cost: Rs 11, 222, 000

No of orders: 362 times

Ordering Cost per order (o) = Rs. 31, 000

carrying cost per litres ©: Rs 1.1

Annual Demand/ Consumption (A): 1,13,00,000

Applying Formula,

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 11300000 \times 31{,}000}{1.1}}$$

$$= 798065.84 \text{ ltrs}$$

Here, By multiplying A (113,00,000 ltrs) and 0 (Rs.31,000) with 2 and dividing 1.1 and taking square of this figures, the result comes 798065.84 litres.

ii) Trial and Error Method/Tabulation Method/Optimum level inventory model

We have been used formula to determine the no. of order size. And that order size where total inventory cost will be minimize, will be the economic order quantity in Trial and Error Method (Table No, 4)

$$\text{No of order size} = \frac{Annual\ Demand}{EOQ}$$

$$= \frac{11300000}{798065.84}$$

= 14 times

Total Carrying cost = Average inventory ×carrying cost per unit

Total Cost = Carrying cost + ordering cost

$$\text{Order size} = \frac{Annual\ Demand}{No\ of\ order}$$

$$\text{Average Inventory} = \frac{Order\ size}{2}$$

Table: 4

Calculation of EOQ

No. of order	Order size	Average Inven.	Ordering cost	Carrying cost	Total Cost
5	22,60,000	11,30,000	1,55,000	12,43,000	13,98,000
10	1130,000	5,65,000	3,10,000	6,21,500	9,31,500
14	807142.86	403571.43	4,34,000	4,43,928.57	8,77,92857
15	753333.33	376,666.67	4,65,000	4,14,333.33	879333.33
20	565,000	282,500	620,000	3,10,750	9,30,750
362	31215.47	15607.73	11222000	17,168.51	11239,168.51

Source: SGML

d) For Fiscal year 2063/064

On the basis of the project's record, the following data are available.

i) Mathematical /Formula Method

Total Ordering Cost = Rs. 1,19,46.000

No of Orders = 362 times

Ordering cost per order = (0) Rs. 33000

Carrying cost per litres © = Rs. 1.5

Annual Demand /Consumpti0n (A)= 1,15,00, 000 litres.

Applying Formula,

$$EOQ = \sqrt{\frac{2AO}{C}}$$

$$\sqrt{\frac{2 \times 1{,}15{,}00{,}000 \times 33{,}000}{1.5}} = 7{,}11{,}336.77 litres$$

Here, By multiplying A (1,15,00,000 ltrs) and 0 (Rs. 33,000) with 2 and dividing 1.5

and taking square of this figure, the result comes 7, 11,336.77 litres.

ii) Trial and Error Method/Tabulation Method /Oprimum level inventory model

We have been used formula to determine the no. of order size. And that order size where total inventory cost will be minimize, will be the economic order quantity in Trial and Error Method (Table No. 5)

$$\text{No. of order size} = \frac{\text{Annual Demand}}{EOQ}$$

$$= \frac{11500{,}000}{7{,}11{,}336.77} = 16 times$$

Total carrying cost= Average Inventory ×Carrying cost per unit

Total cost = Carrying cost + ordering cost

Order size = $\frac{Annual\ Demand}{No.of\ order}$

Average Inventory = $\frac{Order\ size}{2}$

Table 5

Calculation of EOQ

No. of Order	Order size	Average Inventory	Ordering Cost	Carrying cost	Total Cost
5	23,00,000	11,50,000	1,65,000	17,25,000	1890,000
10	11,50,000	5,75,000	3,30.000	8,62500	11,92,500
15	766666.67	383333.33	495,000	5,75,000	10,70,000
16	7,18,750	3,59,375	5,28,000	539063	10,67,063
20	5,75,000	2,87,500	6,60,000	431250	1091,250
362	31,768	15,884	1,19,46,000	23826	119,69,826

e) For fiscal year 2064/065

On the basis of the project's record, the following data are available:

i) **Mathematical /Formula method**

Total ordering cost: Rs. 126, 70000

No of order : 362 times

Ordering cost per order (o)= Rs. 35000

Carrying cost per litres(C) = Rs. 2

Annual demand/Consumption (A) : 11600000 litres

Applying formula, EOQ $= \sqrt{\frac{2AO}{C}}$

$= \sqrt{\frac{2 \times 11600000 \times 35000}{2}}$

= 637181 liters

Here, By multiplying A (11600000 litres) and o (Rs. 35000) with 2 and dividing 2 and taking square of this figure, the result comes 637181 litres.

ii) Trial and Error Method/Tabulation Method/optimum level inventory model.

We have been used formula to determine the no of other size. And that order size where total inventory cost will be minimize, will be the economic other quantity in Trial and Error method (Table No. 6)

No of order size = $\frac{Annual\ Demand}{EOQ}$ $= \frac{11600000}{637181}$ = 18 times

Total carrying cost = Average Inventory×carrying cost perunit

Total cost = carrying cost + Ordering cost

Order size = $\frac{Annual\ Demand}{No.of\ order}$

$$\text{Average inventory} = \frac{Order\ size}{2}$$

Table : 6

Calculation of EOQ

No. of order	order size	Average Inventory	ordering cost	carrying cost	Total cost
5	2320000	1160000	175000	2320000	2495000
15	773333	386666.67	525000	773333	1298333
17	682353	341176.47	595000	682353	1277353
18	644444	322222	630000	644444	1274444
19	610526	305263	665000	610526	1275526
362	32044	16022	12670000	32044	12702044

Source: SGML

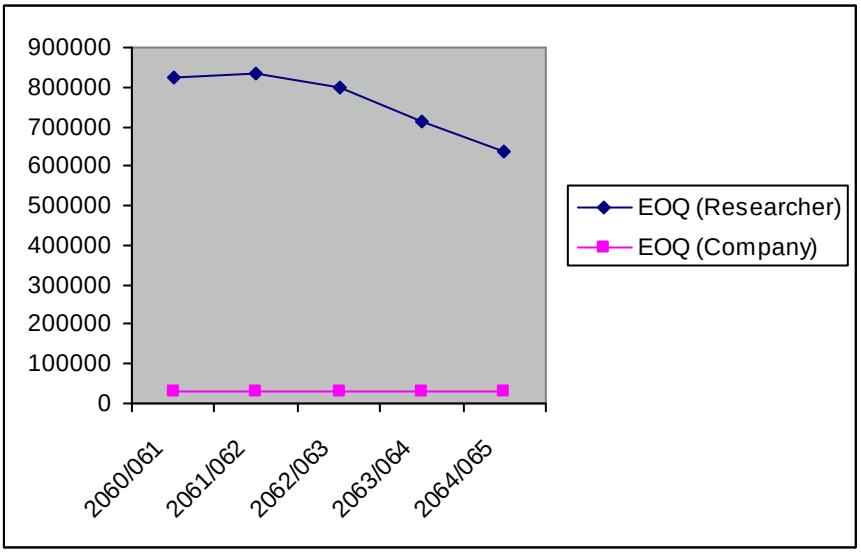

Figure 8: Graphical Presentation of EOQ.

4.3.2 EOQ of Milk and T-test

Here, we use t-test for hypothesis testing because sample size small (H<30)

Table : 7

EOQ of Milk and T-test

Fiscal year	EOQ ltrs	EOQ (Company)	Total usage	No. of order
2060/061	826307	30895	11184000	362times
2061/062	833509	30387	11000000	362times
2062/063	798066	31215	11300000	362times
2063/064	711337	31768	11500000	362times
2064/065	637181	32044	11600000	362times

Source: SGML

Note: EOQ calculate by company = $\frac{Total\,Usage}{No.of\ order}$

Test of Hypothesis

It is a tentative consideration of any results. The test of hypothesis is a process of testing of significance regarding the parameter of the population on the basis of the sample drawn from the population. Thus the test of hypothesis discloses the whether the difference between the computed statistics and hypothesis parameter is significant.

In statistics, by a hypothesis we mean a tentative conclusion logically drawn regarding any parameter of the population.

The statistical hypothesis may be divided into two types :Null Hypothesis and Alternative Hypothesis. There is direct relationship between Null and alternative hypothesis

a) Null Hypothesis

A statistical hypothesis which is started for the purpose of possible acceptance is called a null hypothesis and is denoted by Ho. In the above examples (a) the null hypothesis may be express symbolically as

$Ho=\mu = 160$

While formulating a null hypothesis we should take care of the following two points.

i) If we want to test the significant of the difference between two samples statistics then we formulate a null hypothesis that the difference is not significant. This implies that the difference is just due to fluctuations of sampling.

$Ho=\mu = x$

ii) If we want to test any statement about the population we formulate the null hypothesis that it is true. For example: If we want to find whether the population mean has specified value μ_0 then we formulate the null hypothesis $H_0 :\mu= \mu_0$

b) Alternative Hypothesis

Any hypothesis, which is complementary to the null hypothesis is called an alternative hypothesis and is denoted by μ_1. Generally 3 types of alternative hypothesis:

i) Is the given sample come from the given population whose mean is 40.

Sample mean (x) = 38

Ho: $\mu = 40$

H_1: $\mu \neq 40$ ($\mu > 40$, $\mu < 40$)

It is called two tailed alternative hypothesis.

ii) Is the sample come from the population whose population mean less than exist one. Population mean

$\mu = 40$ sample mean (x) = 38

Ho: $\mu = 40$: The given sample come from the given population whose population mean is 40 and difference in population mean and sample mean is due to sample fluctuation.

H_A:$\mu < 40$: The given sample come from this whose population mean is less than 40.

This called left-tailed alternative hypothesis at least.

iii) Is the given sample come from the population whose population mean is greater than existing one.

$\mu = 40$ x= 42

Ho: $\mu = 40$: Null Hypothesis

H_A: $\mu > 40$: Alternative Hypothesis

It is called Right -tailed alternative hypothesis at most.

Table : 8

EOQ of Milk and T-test

Fiscal year	EOQ ltrs	EOQ (Company)	$[X \bar{X}]^2$	$[Y \bar{Y}]^2$
2060/061	826307	30895	4228510729	134689
2061/062	833509	30387	5217028441	765625
2062/063	798066	31215	1353209796	2209
2063/064	711337	31768	2494303249	256036
2064/065	637181	32044	15400561800	611524
Mean	761280	31262	Σ=28693614020	Σ=1770083
S.D.	84695.95	665.22		
C.V.	11.13%	2.13%		

Source:SGML

Here,

Let X and Y are the EOQ determined by researcher and company respectively.

Mean($\bar{X}$) = $\frac{\sum x}{N}$ or $\frac{\sum y}{N}$ S.D. σx = $\sqrt{\frac{\left[X-\bar{X}\right]^2}{n-1}}$

S.D. σy = $\sqrt{\frac{\left[Y-\bar{Y}\right]^2}{n-1}}$ Co-efficient of variance C.V.x= $\frac{\pm x}{\bar{X}}$ C.V.y = $\frac{\pm y}{\bar{Y}}$

First, Testing Difference Between Means of two samples:

[Independent samples = Project's or Researcher's]

Hypothesis

H_o:μ_y =μ_x (The samples have been drawn from the normal population with the same mean. There is no significant difference between two mean of EOQ determined by the project and the researcher)

Ho:μy ≠μx (The samples have not been drawn from the normal population whose population mean is not same. There is significant different between population or project mean and sample or researcher mean of EOQ)

Test the hypothesis (Statistics)

t = $\frac{\bar{X}-\bar{Y}}{S}\times\sqrt{\frac{n_1 n_2}{n_1+n_2}}$

S= $\sqrt{\frac{1}{n_1+n_2-2}\left[\left(X-\bar{X}\right)^2+\left(Y-\bar{Y}\right)^2\right]}$

Where,

X_1 = mean of the Researcher

Y_1 = mean of the company's

n_1 = number of observations in the Research

n2= number of observations in the Project

S = Combined Standard deviation

Therefore,

$$t = \frac{761280 - 31262}{59890.93} \times \sqrt{\frac{5 \times 5}{5+5}} = 12.189 \times 1.581 = 19.27$$

$\therefore$ t = 19.27

working,

$$S = \sqrt{\frac{1}{5+5-2}[28693614020 + 1770083]}$$

$$= \sqrt{3586923013}$$
$$= 59890.93$$

Decision

The tabulated value of t for [n_1 + n_2-2] 8 degree of freedom of 5% level of significant is [for V = 8 $t_{0.5}$] 2.306. Since calculated value of t is greater than tabulated value, there for the difference is significant and null hypothesis is being rejected or not accepted at 5% level of significant on (2 tailed test) that the mean of the sample have not been drawn from the normal population.

To test the significance of the mean of a random sample:

[Researcher sample]

Hypothesis

Ho :μ = X (The samples have been drawn from the normal population with the same mean. There is no significant difference between population and sample mean or this sample come from this mean Difference between this mean is due to sample fluctuation)

Ho: μ≠ X (The samples have not been drawn from the normal population with the same mean. There is significant different between from population and sample or this sample not come from this)

Test the hypothesis (Statistics)

$$t = \frac{(\bar{X} - «)\sqrt{N}}{S}$$

Where,

X = the mean of the sample (Researcher)

μ = the actual or hypothetical mean of the population (Project)

N = the sample size

S = the standard deviation of the sample

Note:

The population mean calculated by company target milk collection. Company target of milk 11300000 litres in 362 days so mean 31215.47 litre.

$$t = \frac{761280 - 31215.47}{84695.95} \times 2.2361 \qquad = 19.274$$

Working,

$$S.D. = \sqrt{\Sigma \frac{(X - \bar{X})^2}{n-1}} \qquad = \sqrt{\frac{28693614020}{5-1}} \qquad = 84695.95$$

Decision

The tabulated value of t for [n-1] 4 degree of freedom at 5% level of significant is [For V = 4 t 0.05] 2.776. Since the calculated value of t

is greater than tabulated value. Therefore the difference is significant and null hypothesis is being rejected or not accepted at 5% level of significant on (2 tailed test) that the mean of the sample have not been drawn from the normal population.

4.4 Re-order point of Milk in SGML

Re-Order point is that level of inventory at which the firm places an order with the suppliers for procuring additional inventory equal to economic order quantity when the inventory reaches the re-order point. The researcher try to analyze the re-order point of milk on the basis of lead time safety stock kept by the company as well as daily usage rate of 5 years i.e. 2060/61 to 2064/065.

Table : 9

Calculation of Re-order point

Fiscal year	Usage Rate	Lead time	Re-order point	safety stock days	safety stock in units	safety stock + lead time	Re-order point
2060/061	30641	1	30641	2	61282	3	91923
2061/062	30137	1	30137	2	60274	3	90411
2062/063	30959	1	30959	2	31918	3	92877
2063/064	31507	1	31507	2	63014	3	94521
2064/065	31781	1	31781	2	63562	3	95343

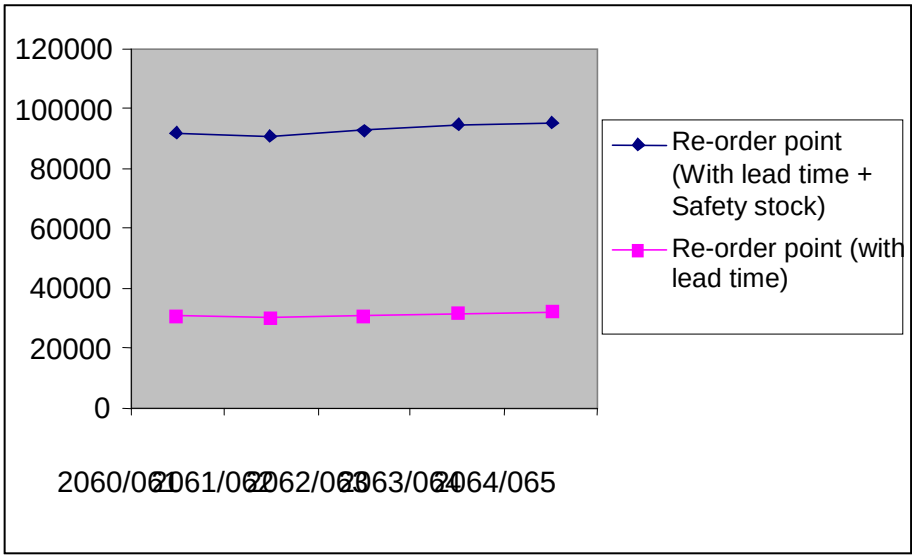

Figure: 9 Graphical presentation of Re- order point (with lead time and lead time safety stock)

Note:

This data is given by SGML collection and processing department. SGML need daily fresh milk so lead time 1 days and project have 2 days safety stock all day [They covered 2 days by use skimmed milk powder and milk] project hold safety stock for the view point of strike in Nepal and Kathmandu valley.

Some formulate to calculate Re-order point

Usage Rate $\frac{Annual\ consumption}{No.of\ days\ in\ a\ year}$

= Re-order point (ROP) = Usage Rate × lead time [When safety stock is not mentioned]

= Re-order Point (ROP) = Usage Rate × (lead time + safety stock in days)

The above table includes calculation of Rop including and excluding safety stock. The highest re-order point in which safety stock excluding and including is 31781 litres and 95343 litres respectively in year 2064/065. And the lowest re-order point in which safety stock excluding and including is 30137 litres and 90411 litres respectively in year 2061/062. In year 2064/064; 637181 litrs of milk to be procured in a year with the number of order 18 times. According to ROP when the balance remains for 1 days consumption (31781 litres) another order for 637181 litrs should be placed. And every 20 days next fresh order should be made. In other words next order should be placed in the difference of 20 days i.e. the practices used by the company for the safety stock is equal to 2 days consumption. If we consider this safety stock the order should be placed by keeping 3 days consumption i.e. (3×31781=95343 litres) it means when the inventory falls to 95343 litres that another order for 637181 litrs has to be placed. In this way we can compute ROP for next remaining days.

4.5 Turnover Ratio

4.5.1 Inventory Turnover Ratio

It measures the efficiency on inventory management and how quickly inventory is sold. It indicates the relationship between the cost of goods sold and the inventory level. In general high turnover ratio is better than low ratio. High turnover ratio indicates good inventory management finished goods are quickly selling over a period of time and able to earn profit by it.

Table : 10

Calculation of Inventory Turnover Ratio of SGML

Fiscal Year	Cost of good sold	Average inventory	Turnover Ratio (Times)
2060/061	219932000	8011209	27.45
2061/062	99452320	2150785	46.24
2062/063	102114500	4303181	23.73
2063/064	108843000	4435330	24.54
2064/065	104219000	6055723	17.21
		Mean	27.834

Similarly, a very low inventory turnover ratio is dangerous. It signifies excessive inventory or over-investment in inventory. Low inventory level shows firm has more stock of finished goods for sale. Due to this, inventory involves cost in terms of interest of blocked amount rental of warehouse damage/ deterioration and so on. A low ratio may be the result of obsolete goods, over-valuation of closing stock, reduce demand in market, more purchase of raw materials in anticipation of future increase in their process and so on.

So firm has to keep optimum level of inventory. Through the study of ITR it helps to detect the imbalance investment in the various inventory components. Inventory turnover Ratio can be calculated by dividing cost of goods sold by the average inventory.

$$\text{Inventory Turnover Ratio} = \frac{Cost\ of\ Goods\ Sold}{Average\ Inventory}$$

Here, cost of goods sold computed adding opening stock, purchase (milk purchase raw materials, other purchase, inter scheme purchase), manufacturing expenses (Processing cost, administrative cost, depn cost, interest cost etc) and deducts closing stock. Average inventory is computed by adding closing stock. Adding opening inventory and closing inventory and dividing by 2 compute average inventory.

Another way, we can compute the inventory Turnover Ratio by dividing closing stock to sales.

$$\text{Inventory Turnover Ratio} = \frac{Sales}{Closing\ Stock}$$

In this formula sales is values at market price and closing stock is valued at costs it is not comparable. Appropriate formula to calculate Inventory Turnover is described earlier.

From the above table it is clear that Inventory Turnover Ratio is fluctuating every year. In year 2064/065, Turnover Ratio is very low. It means more inventories are kept in the stock house. Due to more inventories are kept in the stock, unnecessary investment tied up on it. It direct effects on the profitability of the firm. From the study of five fiscal years period, the high turnover ratio is 46.24 times in 2061/062 fiscal year. And also 2060/061, 2062/063 and 2063/064 year inventory turnover Ratio be low but little good.

In totality, the Sitaram Gokul Milks (Kathmandu) Ltd's efficiency in inventory is poor. SGML is not able to change its inventory into

receivable/ cash through sales. So SGML has to give more attention in inventory management.

4.5.2 Inventory Holding Days (IHD)

Inventory Holding days represent how many days company holds the average inventory. The formula to calculate IHD is as follows.

$$\text{IHD} = \frac{Average\ Inventory}{Cost\ of\ goods\ sold} \times 365$$

$$\text{IHD} = \frac{\text{Closing stock}}{\text{Sales}} \times 365$$

Note : If cost of goods sold is not available this time we have to use second formula.

Table : 11

Calculation of inventory Holding days

Fiscal Year	Cost of good sold	Average inventory	Turnover Ratio (Times)
2060/061	219932000	8011209	13.29
2061/062	99452320	2150785	8
2062/063	102114500	4303181	15.38
2063/064	108843000	4435330	14.87
2064/065	104219000	6055723	21.20
		Mean	14.55

Inventory holding days represented the how many days project hold the inventory in factory or warehouse without any work year by year. Low IHD represented or indicated a good inventory management. Finished goods are quickly selling over a period of time and firm able to earn profit by it.

At other way high IHD represented or indicated dangerous. High inventory holding days shows firm has more stock of finished goods for sale. Due to this inventory involved cost in terms of interest of blocked amount, rental of warehouse, damage and so on and firm not able to earn profit by it. From the above table inventory holding day of SGML from 2060/061 to 2064/065 fiscal year being represented. The mean of inventory holding day is 14.55. In other words the project holds average inventory 14.55 days in regards of mean. In 2062/063, 2063/064 and 2064/065 fiscal years IHD had crossed the mean where as in the rest of the years, IHD has remained below the mean.

4.6 Ratio Analysis

Financial Analysis is an evaluation of both a firm's post financial performance and its prospects for the future. Financial statement analysis involves the calculation of various ratios. In mathematics a ratio is the relationship between two quantitative figures. The ratio analysis is the financial tool by which the financial strength and weakness are measures by relating two accounting data.

4.6.1 Inventory to Total Assets Ratio

Here, Inventory means closing inventories of raw materials, finished goods, other stocks and constructing materials and spare parts. And fixed assets includes this asset, Which observed the depreciation cost

year by year. The formula to calculate the relation between inventory to total fixed Assets is

$$\text{Inventory to Total Assets Ratio} = \frac{\text{Inventory}}{\text{Total Fixed Assets}}$$

Table : 12

Calculation of Inventory to Total Fixed Assets Ratio

Fiscal Year	Inventory	Total fixed Assets	Inventory Assets Ratio
2060/061	14537686	284255320	5.11%
2061/062	2258852	275248542	8.20%
2062/063	6347510	282265432	2.24%
2063/064	2523150	264372512	9.54%
2064/065	9588306	286455122	3.34%
		Mean	5.686%

Source: SGML

From the study of SGML, we know that minimum inventory to total fixed assets ratio 2.24% in year 2062/063. Maximum inventory holds as a assets is 9.54% in year 2063/064. In year 2062/063 the inventory to total fixed assets ratio is good. In other words the project has minimum inventory level in relation to total fixed assets.

According to our study inventory management low inventory to total fixed assets ratio preferred the good efficiency in inventory management. Because if good efficiency in inventory management this could make

closing inventory level being low and sales being high. At the assumption of SGML in year 2062/063 ratio being good and other year also ratio being little be fit. So the project not being hold high amount of money in the field of inventory. If project needs money, we can't immediate change into cash. So enough money invested in inventory not so good for the company.

4.6.2 Inventory to Net sales Ratio

Inventory to sales Ratio is wanted low in manufacturing industries.

$$\text{Inventory to sales Ratio} = \frac{\text{Inventory}}{\text{Net Sales}}$$

Here, inventories includes closing stock of raw materials, finished goods, other stocks and stores and spare parts. Net sales means that sales amount or actual amount which comes from the sale of the milk and milk product at Sitaram Gukul Milks (Kathmandu) Ltd.

Table : 13

Calculation of Inventory to Net sales Ratio

Fiscal Year	Inventory	Net Sales	Inventory to Net sales Ratio
2060/061	14537686	206009280	7.05%
2061/062	2258852	107564960	2.09%
2062/063	6347510	15711100	4.04%
2063/064	2523150	47056747	5.3 6%
2064/065	9588306	96793500	9.90%
		Mean	5.69%

Source: SGML

According to our requirement we focused our study on inventory management For the requirement fulfillment we calculate the SGML inventory management efficiency through the inventory to sales ratio.

Inventory to sales ratio we calculate in above table. By the calculation we know the relationship between inventory and sales are negative. If sales are increase inventory are decreased and if sales are decrease inventory are increase. Therefore firm always want to minimize the closing inventory in the firm. So low inventory to sales are necessary to the firm.

According tot above table of inventory to sales it is clear that highest ratio 9.90% in 2064/065. The mean is 5.69% and it crosses in 2060/061 and the level of below mean in remaining years.

4.6.3 Inventory to current Assets Ratio

$$\text{Inventory to current Assets Ratio} = \frac{\text{Inventory}}{\text{Current Assets}}$$

Here, inventories include closing stock of raw materials, finished goods, other stocks and stores and spare parts. Current assets includes debtors, inventories, prepaid expenses, advance deposits, staff loan and advance, different revenue expenses, cash in hand and cash at bank etc.

Table : 14

Calculation of Inventory to current Assets Ratio

Fiscal Year	Inventory	Current Assets	Inventory to current Assets Ratio
2060/061	14537686	18643240.25	77.97%
2061/062	2258850	8987720.58	25.13
2062/063	6347510	12349719.44	51.39
2063/064	2523150	12851600.85	19.63
2064/065	9588306	14896695.58	64.36
		Mean	47.696%

Source: SGML

According to above table of inventory to current assets it is clear that the highest ratio 77.97% in 2060/061. The mean is 47.696% and it crossed in 2062/063 and 2064/065 and the level of below mean in remaining year. In the context of SGML has satisfactory level in no year. All year the company had bad position in respect of inventory to current assets ratios.

4.6.4 Inventory to profit Ratio

This ratio tells how much inventory is needed to create a good profit.

Here, inventories includes total amount of main materials consumed by SGML. According to SGML main materials is Milk. We need total amount of Milk. Except collection cost profit includes total amount of profit/loss. Which earn by project in five fiscal years respectively. The formula to calculate inventory to profit ratio is as follows.

$$\text{Inventory to profit Ratio} = \frac{\text{Inventory}}{\text{Profit Ratio}}$$

Table : 15

Calculation of Inventory to Profit Ratio

Fiscal Year	Inventory	Net Sales	Inventory to profit Ratio
2060/061	109966000	(4686000)	Negative
2061/062	49726160	(15464520)	Negative
2062/063	51057250	(1356585)	Negative
2063/064	54421500	(20820000)	Negative
2064/065	52109500	(18394000)	Negative

Source: SGML

From the above table it is clear those ratios are negative. It means company do not generate the profit. Project earns loss year by year so no ratio can be calculated negative position. In other hands company need high positive in this ratio. Project earns loss year by year here. So the company suffer bad condition year.

4.7 Regression Analysis

Regression analysis in the general sense means the estimation or prediction of the unknown value of one variable from the known value of the other variable. It is specially used in business and economics to study the relationship between two or more variables that are related causally.

Regression analysis is a mathematical measure of the average relationship between two or more variables in terms of the original units of the data.

This topic is related with the analysis of the relationship between closing stock and sales. Main inventory purchase and sales, sales expenses and sales and closing stock and net profit of SGML based on the historical data.

4.7.1 Regression on closing stock and sales

On the basis of variable derived from annex, closing stock of milk and milk product on sales of milk and milk product following results are obtained. Here, in the analysis we assume the sales is the values of stock is the values of the independent variables denoted by x. The regression equation of y on x, which is used to describe the variation in the value of y for given change in the value of x.

Table : 16

Calculation of regression Result [Amount '000000']

Fiscal Year	Net Sales(Y)	Closing stock(X)	Results
2060/061	206.009280	14.537686	
2061/062	107.564960	2.258852	
2062/063	157.111100	6.347510	$\sum xy = 5281.952757$
2063/064	47.056747	2.523150	$\sum x^2 = 355.0395$
2064/065	96.793500	9.588306	
	$\sum y = 614.535587$	$\sum x = 35.255504$	

Source: SGML

According to this data we calculate, regression of y on x be

$Y = a + bx$ …….(i)

$\sum y = na + b\sum x$……. (ii)

$\sum xy = a\sum x + b\sum x^2$……. (iii)

$a = 60.0595, b = 8.9132$

$\therefore Y = 60.0595 + 8.91232x$

The above regression equation shows a positive relationship between closing stock and sales. The slope coefficient of 8.9132 means the marginal propensity to earn sales revenue Rs. 8.9132 meaning that if the value of closing stock increases by a rupee. On the average the sales goes up by 8.9132.

The intercept value of 'a' are 60.0595 means that the average value of closing stock would be 60.0595 lakhs, If sales were zero.

4.7.2 Regression on Inventory and sales

On the basis of variable derived from annex. Inventory which is main part of production process of SGML that is milk and this purchase. In other words main inventory purchase on sales of milk and milk product following result are obtain.

Here, in the analysis we assume the sale is the values of the dependent variable which is denoted by y and inventory purchase by SGML is the values of independent variables which is denoted by x. The regression equation of y on x which is used to describer the variation in the value of y for given change in the value of x.

Table : 17

Calculation of Regression Results (SGML) [Amount '000000']

Fiscal Year	Net Sales(Y)	Inventory(X)	Result
2060/061	206.009280	182.887522	
2061/062	107.564960	130.1911046	
2062/063	157.111100	139.0856194	$\sum xy$= 94896.70015
2063/064	47.056747	136.3419487	$\sum x^2$ = 112182.2023
2064/065	96.793500	154.436705	
	$\sum y$ = 614.535587	$\sum x$=742.9428997	

Source: SGML

According to this data we calculate regression of year

a = -174.6841 b= 2.0028

y = -174.6841+2.0028x

The above regression equation shows a positive relationship between inventory and sales.

The slope coefficient of 2.0028 means that the marginal propensity to earn sales revenue Rs. 2.0028 meaning that if the value of inventory increase by a rupee on the average the sales goes up by 2.0028.

The intercept value of 'a' is (-) ~ 174.6841 means that's the average expenditure on main inventory purchase would be minus (-) 174.6841, if the sales were zero.

4.7.3 Regression on sales expenses and sales

On the basis of variable derived from annex sales express is main part of expenses during the period of milk and milk product sales on sales obtained by SGML as:

Table : 18

Calculation of Regression Results [Amount '000000']

Fiscal Year	Net Sales (Y)	Sales Exp.(X)	Result
2060/061	206.009280	4.924536	
2061/062	107.564960	3.67945347	
2062/063	157.111100	3.87059618	
2063/064	47.056747	4.02178099	$\sum xy = 2357.352$ $\sum x^2 = 71.3378$
2064/065	96.793500	1.546654	
	$\sum y = 614.535587$	$\sum x = 18.043026064$	

Source: SGML

According to this data we calculate regression y on x be a

a = 41.93747 b= 22.4379

y = 41.93747+ 22.4379x

Here in the analysis we assume the sales is the values of the dependent variables which is denoted by y and sales expenses which actually spend in area of sales of milk and milk product by SGML is the values of independent variables which is denoted by x. The regression equation of y on x which is used to describe the variation of y on x which is used to describe the variation in the value of y for given change in the value of x.

The above regression equation shows a positive relationship between sales and sales expenses.

The slope coefficient of 22.4379 means the marginal propensity to earn sales revenue Rs. 22.4379 meaning that if the values of sales expenses increases by a rupee. On the average the sales goes up by 22.4379.

The intercept value of 'a' 41.93747 means the average value of sales expenses would be 41.93747 lakhs if the sales were zero.

4.7.4 Regression on Raw-materials purchased and its purchases expenses

On the basis of variable derived from annex purchase expenses means the cost, which is expend through the purchasing process. Except the cost of raw material its observed only the material collection cost on the raw material purchased cost except collection cost. Here raw material means main materials of SGML, which is milk. Here, in the analysis we assume the purchasing expenses is the values of dependent variable which is denoted by 'y' and raw material purchased which project actual spend through the raw-material purchase or this amount which project give the exchange of raw-materials is the value of independent variables which is denoted by 'x'. The regression evaluation of y on x which is used to describe the variation in the value of y for given change in the value of x.

Table : 19

Calculation of Regression Results [Amount '000000']

Fiscal Year	Purchase Exp (y)	Raw material purchase (x)	Results
2060/061	11.06549751	109.966000	
2061/062	8.128367	49.736160	
2062/063	6.645649	51.057250	$\sum xy$= 2972.5484
2063/064	8.809883	54.421500	$\sum x^2$ = 22850.1493
2064/065	10.222521	52.109500	
	$\sum y$= 44.87191951	$\sum x$=317.29041	

Source: SGML

According to this data we calculate regression of y or x.

a= 6.0518 b= 0.0461

y = 6.0518+0.0461x

The above regression equation shows a positive relationship between purchase expenses and raw material purchased. The slope coefficient of 0.0461 means the marginal propensity to earn purchase expenses R. 0.0461 meaning that if the value of raw material purchase cost increase by Rupee 1 on the average the purchase expenses increase by 0.0461. The intercept value of 'a' 6.0518 means that the average value of raw material purchase cost would be 6.0518 lakhs if the sales were zero.

4.7.5 Regression on closing stock and net profit

On the basis of variable derived from annex the regression equation of net profit which project actually earn year by year on closing stock which hold the project and of the fiscal year.

Here, in the analysis we assume the net profit is the values of depended variable's which is denoted by 'y'. And closing stock which hold the project and of the fiscal year is the value of independent variables which is denoted by x. The regression equation or evaluation of y on x, which is used to describe the variation in the value of y for given change in the value of x.

Table : 20

Calculation of Regression Results [Amount '000000']

Fiscal Year	Net profit (y)	Closing stock (x)	Results
2060/061	(4.686000)	109.966000	
2061/062	(15.464520)	49.736160	
2062/063	(13.656585)	51.057250	∑xy= 4073.1173
2063/064	(20.820000)	54.421500	$\sum x^2$ = 22849.1547
2064/065	(18.3940000)	52.109500	
	∑y = (73.021105)	∑x=317.29041	

Source: SGML

According to this data we calculate regression of y on x.

a= -218.0431531 b= 3.20598

y = -218.0431531+3.20598x

The above regression equation shows that negative relationship between stock and project net profit.

The slope coefficient of 3.20598 means marginal propensity to earn net profit 3.20598 meaning that if the value of closing stock increases by a rupee on the average net profit increase by 3.20598.

The intercept value of 'a' minus (-) 218.0431531 means that average value of closing stock would be -215.0431531 lakhs if net profit were zero.

4.8 Problem faced by SGML in the management of inventory.

Above the analysis of companies data, we find out following problems faced by SGML in the management of inventory.

i) SGML has lack of study on effective and efficient inventory management system. Due to this huge money to blocked in the inventory.

ii) There is not proper and timely improvement in inventory management in SGML.

iii) The economic order quantity model was not following the purchasing decision by SGML

iv) The inventory turnover ratio was not satisfactory.

v) There is no significant relationship between inventory & profit.

CHAPTER - V

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary

Nepal is underdeveloped country, living standard of the people sake of rising. The balance of development of both the agriculture as well as industrial sectors in the people basis need of the any country to overall development of their nation.One of many causes of being eliminated poverty of our country is due to ill balance development. Guidelines, leaders and management are extremely needed to finish the industrial aspect where as in the agricultural sectors also the infracted is not well developed.

In modern age, for economic development many subsection of the economy identifying in agriculture area of Nepal. For example fishing, bee keeping, grain production, lives stock and forestry: one of these milk production and supply is one of the helpful business. Being a agriculture country, Nepal has to give importance to milk production. So that production of milk should be given more attention from the side of farmer and from the side of government it has to manage properly.

Government should encourage produce much milk. This may be a good Job for jobseeker of the country and backbone of our agricultural economy.

A dairy development commission was formed in 1955. The first five-year plan (in I.S, 1952-57) had stressed the need for developing a modern dairy industry. The dairy development commission was converted to the Dairy Development Board in 1962. In order to meet the growing milk

demand in Kathmandu the board was converted to the Dairy Development Corporation (DDC) in July 1969 under the corporation Act of 1964.

Sitaram Gokul Milks (Kathmandu) Ltd. Was established on July 18, 1996. It is a public limited company and promoted by Kedia Organization. The paid up capital of the company is NRs. 61.25 million. The products are pasteurized milk, cream, butter, ghee and yoghurt.

There is always lack of milk products in town areas due to the big population. To fulfill the demand of milk and milks products in the town areas to produce the hygienic milk and milk products and to solve the market problem of farmers, SGML has started to product and distribute milk and milk products. SGML has been collecting cow and Buffalo milk with the farmers to co-operative centers at the price fixed by the enterprise, then brought to chilling centers. The Enterprise has 13 chilling centers around Butwal area in Rupandehi, District in western Development Region of the country.

The basic objective of this study is to analyze and to present the prevailing condition of inventory management system of Sitatram Gokul Milk(ktm) ltd. This is followed by the methodology that is applied in this study to analyze the collected data. For this purpose five years data covering 2060 to 2065 were picked up. The analysis of data and statistical tools such as percentage, correlation analysis and ratio analysis are applied to reach the finding and conclusions. From this study it is found that management of inventory is not satisfactory.

5.2 Conclusion

The analysis of the data brings the finding, which is started already. With the finding of study here some conclusion relating to the inventory management.

The inventory management of SGML and its impact on profitability has been analyzed by using various financial and statistical tools. The various ratios and financial analysis has been noticed amicable performance of the company. However, data analysis and interpretation of SGML is the major findings of the study are as follows:

5.2.1 Economic order Quantity Analysis

Economic order quantity calculated by researcher differences with the economic order quantity of SGML. It is calculated dividing by no of orders by SGML to total usage or consumption of raw materials. In this analysis researcher calculated only the main raw materials milk that uses by SGML. EOQ of company is lesser then researcher's EOQ in all fiscal year between 2060 to 2065. SGML has orders 362 times in a year. The average standard deviation and coefficient of variation of the company is lesser then the calculated by researcher. The hypothesis testing through t-test results the difference is significant at 5% level of significant that the mean of sample have not been drawn from the normal population.

5.2.2 The ABC and VED Analysis

The ABC and VED analysis is a widely used classification technique to identify various items of inventory for the purpose of inventory control. This analysis is important that a firm should not exercise the same degree of control on all types of inventory. We have to classify of all types of

inventory on the basis of nature involve the investment and importance of this items.

Here in ABC analysis we have to plan properly of all inventories items into 3 categories. In the context of SGML 3 groups of raw materials are classified in categories A we found milk at 80% of total value. In categories B we found additive (chemical) at 12% of total value and in categories C we found packing materials at 8% of total value. In the aspect of quantity A, B and C categories hold low, middle and high degree of quantity but not exact figure.

In the same way, in VED analysis is used for spore parts inventory. In regards of SGML packing materials are analyzed by VED analysis. Absence of those items work/production will not stop for some days. According to the company's available data we analysis the packing material in 3 categories. Base milk, additives and packing materials.

5.2.3 Re-order Point Analysis

It has found that lead-time is 1 day during fiscal year 2060 to 2065. Project has maintained 3 days for safety stock during fiscal year 2060 to 2065.

The highest Re-order point in which safety stock excluding and including is 31781 and 95343 liters respectively in fiscal year 2064/065 and lowest ROP in which safety stock excluding and including 30137 and 90411 ltrs respectively in fiscal year 2061/062. The company holds high daily usage 31781ltrs and lowest daily usages 30137 ltrs in fiscal year 2064/065 and 2061/062 respectively.

According to ROP's theory when the balance remain for 3 days (lead time + safety stock) consumption the next order should be made e.g. fiscal

year 2062/063 when stock remain 92877 ltrs next order should be made. But effective management says the company should be procured in a year at one time.

5.2.4 Efficiency on Inventory Management of SGML (Turnover Ratio)

The average inventory turnover and IHD of SGML of 5 years study period (fiscal year 2060/061 to 2064/065) where 27.834 and 14.55 days respectively. The highest ITR is 46.24 times in fiscal year 2061/062 because average inventory of finished goods is very low. It mean's company is able to change its inventory (finished goods) into receivable/cash through sales. The lowest ITR is 17.21 times only in fiscal year 2064/065.

Similarly, the lowest IHD is 8 in fiscal year 2061/062 because of lowest average inventory of finished goods. It means company holds 8 days average inventory. This is little good performance. The highest IHD was 21.20 days in fiscal year 2064/065, which is not good performance It means company hold 21.20 days average inventory.

5.2.5 Ratio Analysis

The average of inventory of Total Assets Ratio Inventory to sales Ratio, Inventory to current Assets Ratio and Inventory to profit Ratio throughout the study period were 5.686%, 5.69%, 47.696%, negative respectively. The highest inventory to total assets Ratio in percentage was 9.54% in fiscal year 2063/064 and lowest Ratio in percentage was 2.24% in fiscal year 2062/063. According to western and Brigham, Company should be hold Inventory to Total Assets are concentrated in 16-30%. Such ratio

has not cross throughout the study period in all fiscal year. It means not required money blocked as an inventory.

The highest and lowest Inventory to sales Ratio was 9.90% and 2.09% in 2064/065 and 2061/062 receptively. The average of this ratio is 5.69%. This ratio is wanted low in manufacturing company but not happen in SGML. Therefore inventory relationship with sales is little bad.

The highest and lowest Inventory to current Assets Ratio was 77.97 and 19.63% in 2060/061 and 2063/064 respectively. This ratio should be concentrated in 45-50%. According to this inventory to current assets ratio was not good in any year. Due to keeping more inventories, as a currents assets the amount blocked in inventory can't utilize in other beneficial areas. In other words investment in inventories were worthless. So it directly effects on the profitability of the company.

The average of inventory to profit ratio was negative. The highest inventory to profit ratio is negative and also the lowest ratio. This could happen because of profit this means company no earns profit in any year. This means also company suffer loss in all study period which effect the calculation of this ratio. So no ratio can be calculated in negative so the project need this ratio positive always.

5.2.6 Regression Analysis

a) The regression equation between closing stock and sales shows a positive relationship.

The slope coefficient of 8.9132 means the marginal propensity to earn sales revenue Rs. 8.9132 meaning that if the value of closing stock increases by a rupee. On the average the sales goes up by 8.9132. The

intercept value of 'a' are 60.0595 means that the average value of closing stock would be 60.0595 lakhs, If sales were zero.

b) The regression equation between inventory and sales shows a positive relationship.

The slope coefficient of 2.0028 means that the marginal propensity to earn sales revenue Rs. 2.0028 meaning that if the value of inventory increase by a rupee on the average the sales goes up by 2.0028. The intercept value of 'a' is (-) ~ 174.6841 means that the average expenditure on main inventory purchase would be minus (-) 174.6841, if the sales were zero.

c) The regression equation between sales expenses and sales shows positive relationship.

The slope coefficient of 22.4379 means the marginal propensity to earn sales revenue Rs. 22.4379 means that if the value of sales expenses increase by a rupee. On the average the sales goes up by 22.4379. The intercept value of 'a' 41.93747 means the average value of sales expenses would be 41.93747 lakhs if the sales were zero.

d) The regression equation between raw material purchases and its purchase expenses shows a positive relationship.

The slope coefficient of 0.0461 means the marginal propensity to earn purchase expenses R. 0.0461 meaning that if the value of raw material purchase cost increase by Rupee 1. On the average the purchase expenses increase by 0.0461. The intercept value of 'a' 6.0518 means that the average value of raw material purchase cost would be 6.0518 lakhs, if the sales were zero.

e) The regression equation between closing stock and net profit shows a negative relationship

The slope coefficient of 3.20598 means the marginal propensity to earn net profit 3.20598 meaning that if the value of closing stock increase by a rupee, on the average net profit increase by 3.20598. The intercept value of 'a' minus (-) 218.0431531 means that the average value of closing stock would be -218.0431531 lakhs if net profit were zero.

5.3 Recommendation

The study stresses the need for a good inventory management system to the better performance of the company. If SGML initiates steps to the appropriate management of inventory, certainly it will obtain its set objectives successfully on the basic of the study. The following suggestions are recommending for consideration.

a) SGML do not have good practice for optimum no of order to procure the materials which reduces the total inventory cost. Company has ordered of raw materials 362 times during one year. But it is not good for the company it should be order 13 times, 13 times, 14 times, 16 times and 18 times in between 2060/061 to 2064/065 year by year respectively. This conclusion is deducted from the analysis of the data. The company fails how many times the raw materials should order in a year so in this regard it should pay more attention.

b) SGML have 13035,000 litres annual production capacity. But low percentage of production capacity has utilized. According to commercial planning such situation is not good

for the better performance so it should give more emphasis in the production of milk and milk products.

c) The project has lack of study on effective and efficient inventory management system for controlling inventory. Due to this, the huge money to be blocked in the inventory. How much money should be company invested in the inventory? How much inventories should be stocked? How can we minimize the inveteracy cost? What is optimum EOQ? What is optimum ROP? Are the questions, Which the company pays more attention for the better performance?

d) In reality, the factory is not applying the method of calculating maximum, minimum and safety socks. It must apply the modern techniques in inventory management. ABC analysis for keeping and controlling the perpetual inventory must be followed.

e) The financial dimension of inventory management is ignored by SGML. Therefore it must follow the budgetary and financial analysis techniques in inventory management system.

f) There is not proper and timely improvement in inventory management in SGML. So the top-level management purchasing, production and financial aspects of inventory.

g) Materials is an important item of inventory in production in a manufacturing organization so the company takes initiative steps in the element of cost of materials. Company has to give more emphasis on the materials management that

reducing cost of production and effect on selling price per unit. Studies by experts in the field have brought out. If and organization can effect 1% saving in material cost it would be as increasing to production or sales.

h) SGML's efficiency in inventory is poor. During the 5 year's study period, except four years project's inventory turnover ratio is under the average. It indicates excessive inventory kept by the firm. In other words the company has more stock of finished goods for sale due to more inventories are kept in the stock, unnecessary investment tied up on it.

i) Inventory Information will be valuable to the decision makes. Therefore, the factory should keep its inventory record up to date and unnecessary and old spare parts should be auctioned to save the inventory carrying costs.

j) The actual economic order quantity of the company in all fiscal study period is bigger different than calculated EOQ. So its means more in poor inventory management makes this type of different and increase the production cost or this makes both carrying and ordering cost being higher than required.

k) Inventory handling days of the company is being higher. So it is not good efficiency management of inventory because low IHD represented or indicated good inventory management. At other way high IHD represented or indicated dangerous. Inventory holding days sows that more stock of finished good for sale. Due to this inventory involves cost in terms of interest of blocked amount, rental

of warehouse, damage and so on and firm not able to earn profit by it.

l) In the aspect of inventory to current assets ratio. SGML's situation is very poor. During the 5 years study period not any year the project has good position in inventory to current assets ratio it means the project holds more inventory to current assets due to which the project's amount blocked in inventory. In other words investment in inventories were worthless it directly effects on profitability of the company.

m) Sales and profit of the factory are also fluctuating. The amount of sales increased but amount of the profit is not the positive it suffers negative in all study fiscal period. So SGML must modernize. Its marketing strategies regarding price, advertisement and distribution channels. Factory can improve in area of inventory management this affect in cost of inventory.

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