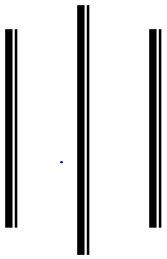
Inventory Management Practices in Manufacturing Industries

"A Comparative Study of Unilever Nepal Ltd. and Dabur Nepal Pvt. Ltd."



A Thesis Submitted to:
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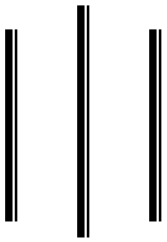

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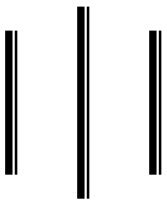

In Partial Fulfillment of the Requirement of the Degree of Masters of Business Studies (M.B.S.), Bhairahawa, Rupandehi, October, 2009

RECOMMENDATION

This is to certify that the thesis

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"Inventory Management Practices in Manufacturing Industries: A Comparative Study of Unilever Nepal Ltd. and Dabur Nepal Pvt. Ltd."

has been prepared as approved by this Department in the prescribed format of faculty of Management. This thesis is forwarded for examination.

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VIVA-VOCE SHEET

We have conducted the viva-voce examination of the thesis presented by

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and found the thesis to be original work of the student and written according to the prescribed format. We recommend the thesis to be accepted as partial fulfillment of the requirement for

Master's Degree in Business Studies (M.B.S.)

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DECLARATION

I hereby declare that the work reported in this thesis entitled "Inventory Management Practices in Manufacturing Industries: A comparative study of Unilever Nepal Ltd. and Dabur Nepal Private Ltd." Submitted to office of the Dean, faculty of management, Tribhuvan University, is my original work done in the form of partial fulfillment of the requirement for the Masters Degree of Business Studies (M.B.S.) under the supervision and guidance of Lecture Dr. Keshav Raj Joshi, Bhairahawa Multiple Campus, Rupandehi.

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Khagendra Bahadur Chhetry

Researcher

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ABBREVIATIONS

UNL	Unilever Nepal Ltd.
DPNL	Dabur Nepal Pvt. Ltd.
Ltd	Limited.
MRP	Manufacturing Resource Planning
DRP	Distribution Resource Planning
EOQ	Economic Order Quantity
JIT	Just In Time
PPC	Profit Planning and Control
CVPA	Cost Volume Profit Analysis
ROL	Re order Level
Qty	Quantity
Amt	Amount
FIFO	First In First Out
LIFO	Last In First Out
RM	Raw Materials
WIP	Work in Process
COGS	Cost of Goods Sold
FY	Fiscal Year

Chapter 1
INTRODUCTION

1.1 Background

Inventories constitute the most significant part of current assets of any business firm. On an average, inventories are approximately 60 percent of current assets in public Ltd. companies. Because of the large size of inventories maintained by firms, a considerable amount of fund is required to be committed to them. It is therefore; absolutely imperative to manage inventories efficiently and effectively in order to avoid unnecessary investment, a firm neglecting the management of inventories will be jeopardizing its long-run profitability and may fail ultimately. It is possible for a company to reduce its levels of inventories to a considerable degree, 10 to 20 percent, without any adverse effect on production and sales, by using simple inventory planning and central techniques. The reduction in 'excessive' inventories carries a favorable impact on a company's profitability.

In the context of inventory management, the firm is faced with the problem of meeting two conflicting needs.

1. To maintain a sufficient size of inventory for efficient and smooth production and sales operation.
2. To maintain a minimum investment in inventories to maximize profitability.

Both excessive and inadequate inventories are not desirable. These are two critical points within which the firm should operate. The objective of inventory management should be to determine and maintain optimum level of inventory investment. The optimum level of inventory will lie between the two danger points of excessive and inadequate inventories. The major dangers of over investment are (i) unnecessary tie up of the firm's funds and less of profit (ii) excessive carrying cost, and (iii) risk of liquidity, these factors are within the control of management, unnecessary investment in inventories thus be cut down.

Maintaining an inadequate level of inventories is also critical. The consequence of under investment in inventories is (i) production hold-ups and (ii) failure to meet delivery commitments. Inadequate raw materials and work in process inventories are not sufficient to meet the demand of customers regularly. They may shift to competitors, which will loss to the firm.

The aim of inventory management thus should be to avoid excessive and inadequate levels of inventories and to maintain sufficient inventory for the smooth production and sales operations. Effort should be made to place an order at the right time with the right source to acquire the right quantity at the right place and quality. An effective inventory management should.

Ensure a continuous supply of raw materials to facilitate uninterrupted productions.
Maintain sufficient stocks of raw materials in periods of short supply and anticipate price changes.
Maintain sufficient finished goods inventory for smooth sales operations and efficient customer service
Minimize the carrying cost and time, and Control investment in inventories and keep it at an optimum level.

1.2 General Background

Unilever Nepal Ltd.:-

Unilever Nepal Ltd. was formed as a subsidiary company of Hindustan Lever Ltd. of India. The factory is situated at Basamadi VDC-5 of Makwanpur district, 6km far from Hetauda of central region of Nepal. The corporate office of the company is situated at 4th floor of Heritage plaza, Kamaladi, Katmandu. Unilever Nepal Ltd was formed as a public Ltd. company in 1993 and production started from Dec.1994. It was registered to company act 2053. As a growing manufacturing company, Unilever Nepal Ltd has main objectives of expanding the domestic business by producing new categories in the domestic market and import substitution of foreign goods too.

Dabur Nepal Private Ltd:

Dabur Nepal Ltd was established in 1992 A.D. under Company Act 2053 B.S. Dabur Nepal Pvt. Ltd was setup as independent group company. This company set a midst the verdant greens and towering mountains of the Himalayan Kingdom of Nepal, has established unique bond of technology and preservation. The guiding force behind Dabur's growth and success has been the wealth of nature and its limitless capacity to support life and it has constantly taking care to preserve and protect this natural beauty.

The main objectives of Dabur Nepal Pvt. Ltd is dedicated to health of all human beings of every household with a deep commitment to deliver results, the employers and employees are determined to the best at doing what matters most. People are its most important assets, it adds value through results driven training and it encourages and rewards excellence. It has superior understanding the consumer needs and develops products to fulfill them better. It works together towards the common vision on principal of mutual trust and transparency in a boundary less organization.

1.3 Statement of the problem:

Inventory is the basic need of any manufacturing business and its management is one of the major parts of the current assets. Most of the Nepalese organizations are the victim of the unscientific inventory management system. It is one of the most important causes to affect adversely on profit of the organization. In Nepalese enterprises whether a public or private sector, top management does not play significant attention towards financial function and they make their scope very narrow. The basic problem of the study is to examine the inventory management system that is exercised by the Unilever Nepal Ltd & Dabur Nepal Pvt. Ltd.

Manufacturing firms must carry adequate inventories to meet scheduled production. However, the firms should also take into account the inventories need for emergency periods, like for the possible delay in delivery due to carrier strike or some other unexpected events. The best policy for the firm is to hold a reasonable size of inventories more than necessary is as much costly as the cost of under stocking. While overstocking is costly in terms of fixed and variable cost of carrying inventory, under

stocking frequently interrupts the production flow and causes a higher production and transportation costs, and loss of revenues. Therefore, a proper management of inventory is a must in order to avoid overstocking and under stocking, and minimize cost.

1.4 Objectives of the study:

The prime objective of this study is to compare the inventory management system of both organizations. More specifically this study has tried to fulfill the following objectives.

1. To compare the inventory level maintained by sampled companies.
2. To evaluate the effectiveness of assets utilization by sampled companies
3. To compare the inventory management techniques used by sample companies.

Significance of the Study

A company should maintain adequate stock of materials for a continuous supply to the factory for an uninterrupted production. It is not possible for a company to procure raw materials when ever it is needed. A time lag existence between demand for materials and its supply; uncertainty also exists in procuring raw materials in time on many occasions. The procurement of materials may be delayed because of such factors as strike, transport disruption or short supply. Therefore, the firm should maintained sufficient stock of raw materials at a given time to streamline production. Other factors which may necessitate purchasing and holding of raw materials inventory are quantity discount and anticipated price increase. The firm may purchase last quantities of raw materials than needed for the desire production and sales levels to obtained quantity discounts of bulk purchasing. At times, the firm would like to accumulate raw materials in anticipation of price rise.

Working process, inventory builds up because of production cycle. Production cycle is the time span between introduction of raw materials into production and emergence of finished product at the completion of production cycle. Till production cycle completes, stock of working process has to be maintained. Efficient firms constantly try to make production cycle smaller by improving their production techniques.

Stock of finished goods has to be held because production and sales are not instantaneous. A firm cannot produce immediately when customers demand goods. Therefore, to supply the finished goods on a regular basis, their stock has to be maintained. Stock of finished goods has also to be maintained for sudden demand from customer. In case of seasonal sales of the firm in nature, substantial finished goods inventories should be kept to meet the peak demand. Failure to supply products to customers, when demanded, would mean loss of the firm's sales to competitors. The level of finished goods inventories would depend upon the coordination between sales and production as well as production time.

The aim of inventory management thus should be avoid excessive and inadequate levels of inventory and to maintain sufficient inventory for the smooth production and sales operations.

Most of Nepalese manufacturing organization are suffering from poor inventory management. Unilever Nepal Ltd and Dabur Nepal Ltd are producing different types of product or diversified product group to meet every day need of people everywhere. Being manufacturing company it spends a lot of time, money and efforts in inventory management. It is known as a greater taxpayer company in Nepal so the researcher is too much interested to examine its inventory management system. Therefore, the researcher has chosen these companies for the study will help to solve the problem faced by Unilever Nepal Ltd and Dabur Nepal Ltd and to Ltd. obstacles in inventory management.

Limitation of the Study

To make the research more specific the study has been conducted with certain limitations. It has the following limitations

A. The study mainly concentrates of the inventory management of Unilever Nepal Ltd and Dabur Nepal Ltd.
B. The study is confined to fiscal year 1999/2000 to 2005/06.
C. The study based on secondary data, which are collected from related department and limits of concern study.
D. This study may not show the overall financial performance of both companies. Because the study focuses only the inventory management

E) This will be case study so it cannot be generalized for all types of manufacturing enterprises.

Structure of the Study:

The study has been organized into five parts, each devoted to some aspects of the study "Inventory Management Practices in Manufacturing Industries: A Comparative Study of Unilever Nepal Ltd. and Dabur Nepal Pvt. Ltd."
The titles of each of the parts are as follows.

1. Introduction
2. Review of Literature
3. Research Methodology
4. Presentation and Analysis of Data
5. Summary, Conclusion and Recommendation.

The rational behind this kind of study is to follow a simple research methodology approach. The contents of each of the parts of this study are briefly mentioned here.
Chapter one contains the introductory chapter of the study, as already mentioned, this chapter describes major issues to be investigated along with objectives and scope of the study.
Chapter two: is devoted to theoretical analysis and brief review of the related literature.
Chapter third: is concern with research methodology. In this chapter research design, nature and source of data, population and sample of data, period cover, data collection method and presentation and analysis of the technique and tools has been described.
Chapter four: deals with analysis and interpretation of inventory management of both organizations.
Chapter five: deals about the summary and findings based on the facts and analysis presented in the fourth chapter.
On the basis of the study, various recommendations and suggestions have also been presented for considerations

Chapter 2
REVIEW OF LITERATURE

2.1 Conceptual Framework

Every manufacturing firm needs various types of assets in order to carry out its functions without any interruption. They are fixed and current assets. Some fixed assets have physical existence and are required to produce goods and services over a long period. This type of fixed assets is called tangible fixed assets. It includes land, building, plant, machinery, furniture and so on. However, some others resources do not generate goods and services directly. However, it reflects the right of the firm. It is called intangible fixed assets. These are patents, copyrights, trademarks and goodwill. Both fixed assets are written off over a period. Current assets are those resources of the firm, which are either held in the form of cash or expected to be converted into cash within an operating cycle of the business. It includes, cash, marketable securities, account receivable, stock of raw materials, work in process and finished goods. Among these, some assets are required for day to day expenses and short term obligations. Inventory is required for day to day operation of manufacturing firms. It includes Raw materials, Work in process, Finished Goods and Store and Spares. Inventory management is concerned with the problem that arises in the management of the current assets and production. It affects the overall functional areas of the firm. Thus, the success or failure of any manufacturing firm ultimately depends upon the efficiency of Inventory management. Therefore, it is crucial aspect of any firm.

2.2. Inventory Concept

The dictionary meaning of inventory is stock of goods or a list of goods. Various authors understand the word inventory differently. In accounting language may mean stock of finished goods. In a manufacturing concern, it may include raw materials, work in process and stores etc. To understand the exact meaning of inventory we may study it from the usage side and from the point of entry in the operation.

Inventory as a current assets, differ from the other current assets because only financial managers are not involved., Rather, all the financial

areas i.e. finance, marketing production and purchasing are involved. The views concerning the appropriate level of inventory would differ among the different functional areas (Khan and Jain, 2003).

Any sort that a firm kept meeting in future requirements of production and sales in called inventory. The basic reason for holding inventory is to keep up the production activities unhampered. It is neither physically possible nor economically suitable to wait for the skills to arrive at when they are actually required. Therefore, keeping up inventory is a most for efficient working of a business unit (Jain and Narang, 1994).

2.2.1 Types of Inventory

Inventories are stock of the product a company is manufacturing for sale and components that make up the product. The various forms in which inventories exist in a manufacturing company are: raw material, work - in - process and finished goods.

Raw Materials: Raw materials are those basic inputs that are converted into finished product through the manufacturing process. Raw materials inventories are those units which have been purchased and stored for future productions.

Work-in-process: Inventories are semi-manufactured products. They represent products that need more work before they become finished products for sale.

Finished goods: Inventories are those completely manufactured products which are ready for sale. Stocks of raw materials and work-in-process facilitate production, which stock of finished goods is required for smooth marketing operations. Thus, inventories serve as a link between the production and consumption of goods.

The level of three kinds of inventories for a firm depends on the nature of its business. A manufacturing firm will have substantially high level of all three kinds of inventories, while a retail or whole sale firm will have a very high level of finished goods inventories and no raw materials and work-in-process inventories within manufacturing firms, there will be differences. Large heavy engineering companies produce long production cycle products. Therefore, they carry large inventories. On the other hand, inventories of a

consumer product company will not be large because of short production cycle and fast turnover.

A fourth kind of inventory, supplies (or stores and spares), is also maintained by firms. Supplies included office and cleaning materials like soap, brooms, oil,, fuel, light bulbs etc. These materials do not directly enter production, but are necessary for production process. Usually, these supplies are small part of the total inventory and do not involve significant investment. Therefore, a sophisticated system of inventory control may not be maintained for them (Pandey, 1999).

2.2.3 Need of inventory management

The question of managing inventories arises only when the company holds inventories. Maintaining inventories involves typing 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? There are three general motives for holding inventories (Star and Ovid, 1962).

Transactions motive: Transactions motive emphasizes the need to maintain inventories to facilitate smooth production and sales operations.

Precautionary motive: Precautionary motive necessitates holding of inventories to ground against the risk of unpredictable changes in demand and supply forces and other factors.

Speculative motive: Speculative motive influences the decision to increase or reduce inventory levels to take advantages of price fluctuations.

2.2.4 Objective of inventory management

The aim of inventory management should be to avoid excessive and inadequate levels of inventories and to maintain sufficient inventory for the smooth production and sales operations. Effects should be made to place an order at the right time with right source to acquire the right quantity at the right price and quality. An effective inventory management should (Pandey, 1979).

Ensure a continuous supply of materials to facilitate uninterrupted production.

Maintain sufficient stocks of raw materials in periods of short supply and anticipate price changes.

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

Minimize the carrying cost and time.

Control investment in inventories and keep it at an optimum level.

2.3 Cost concept

The subject of cost has not been sufficiently covered in the existing literature and inventory management. The problem is complicated because these costs vary from company to company and it becomes difficult to make generalization. Evaluation of these costs often is difficult as most of them do not appear on accounting records and consequently they have to be developed. In many cases they are difficult to isolate and in some cases they have to be estimated on the basis of judgement considering whether they are long term or short term costs.

The most critical cost in inventory situations is the cost of capital tied up in the inventory. This cost is expressed as a percentage of the value of the inventory and is based on past experience. But it can vary with time as conditions change. Generally it is set at the level which management policy may dictate.

There are many cost associated with the size of inventory directly either advocating to decrease the inventory size or suggesting an increase in the inventory size. For an effective inventory analysis and control of the system one should have clear picture about the behavior of cost associated with different factors. Different kinds of cost associated with inventory management are explained below.

a. Ordering cost: Ordering cost is known as procurement costs, is the most clear and major cost in getting inventories. It involves requisitioning, ordering, transporting, receiving, inspecting and storing costs. Ordering cost consists of both fixed and variable cost of manpower and space assign to procurement department and relatively fixed charge of information. Processing telephone

charge, setting up production run and so on is cost per order. Generally, if number of orders increases the ordering cost will increase too and vice-versa.

Ordering cost or procurement cost can be calculated with the help of following formula.

Ordering cost = A/Q x O ……..… (1)

b. Holding cost/carrying cost: The second major category of costs are those associated with carrying the inventory itself such as cost of capital, operational cost spoilage, shortage and depreciation, loss, obsolescence cost, insurance cost, over stock and stock out cost.

Carrying cost can be calculated from the following formula.

Carrying cost = Q/2 ×c..... (2)

c. Stock out cost:

If the stock of goods goes out of stock before the demand for the product is terminated or the stock of raw materials goes out of stock before the product in process is called out of stock, alternatively, if the goods are not available at the time of receiving orders. It loose the possible profit as well as goodwill from customers in the stock out cost production process can be ceases with the insufficient supply of raw materials. Some firms feel so strongly about avoiding this type of cost.

Stock out cost is computed from the following formula:

Stock out Cost = inventory cycle per year x stock out units x probability of possible stock out x unit stock out cost.

Where, inventory cycles per year = $\frac{\text{Annual Usages}}{\text{Quantity order size}}$

(Weston J. Fred and Eugene F. Brigham)

Cost can also classified as follows:

I. Capital Cost:

As a current assets inventory requires some amount of investment. There would not be only possibility of alternative use of money to earn some kind of return which is invested in inventory. In this circumstance, it is essential to

allots cost to rebound lost earning power of money, where the company release from its total investment might be earn 10% from its total investment, then this is a cost of capital tied up in inventory. Alternatively money released from inventory could be used to retire short term loans from bank, is the saving in interest pain for the short term loans, is the cost of money tied up in inventory (Start, Martink, David W, 1977).

II. Operational cost:

To mobilize the available inventory effectively in an organization, it is necessary to implement certain activities i.e. information collecting system, supervision, recording of physical stock and time to time Valuation of inventory. In these activities certain cost are involved and is grouped under operational cost.

III. Spoilage, Shortage and Obsolescence cost:

Some of the product fatigue destroys overtime in shortage. Fatigue of goods differs from time to time and product to product, whatever is the nature of destruction, it reduces the value of stocks and is written off from the current assets of the organization. This is called as a spoilage and obsolescence cost. T he cost exist in different from including outright after a more or less fixed period become technically unsalabic, go out of style and spoiler (Magee John, 1956).

Evaluation of the cost of shortage is difficult because we do not always know what the cost is it we should fail to fill on order (Morgan James, 1963).

IV. Insurance cost:

Many of the goods in inventory requires insurance and it should be included in inventory holding cost whether outside insurance is carried or inventory is self insured.

V. Overstock and Stock out cost:

Eventually every business organization is suffered from the problem of overstock and stock out of production. These problems ultimately involve the costs.

VI. Overstock cost:

When the demand for the item is terminated however goods are still remained unsold, it is known as overstock cost.

2.4 Inventory Management Models

Inventory management models can be classified either push or pull models.

A. Push inventory models:

Push models schedule order for production or order goods in advance of customer demand. Manufactures push the finished products through the distribution channel to intermediaries and the final consumer. Economic order quantity (EOQ), Material requirement planning (MRP) Manufacturing Resource Planning (MRP*) and distribution requirement planning (DRP) are all push models.

- **Economic order quantity (EOQ)**

  This inventory control technique widely used these days in many countries irrespective of developed or developing nature. This model determines the optimal order quantity of an individual item of inventory given its forecasted wage, ordering cost and carrying cost.

  In an ideal environment, forecasting demand would be easy and straight forward. Simply, look at past demand patterns to predict future consumption. Under these condition EQO model can be used to calculated when to order the item and how much to order. The basic EQO equation is as follows: (Bloomberg and Hanna)

  $$EQO = \sqrt{\frac{2\,AO}{C}}$$

  Where, A= Annual Requirement/Demand

  O = Ordering cost per order

  C = Carrying/ Holding cost per unit

- **Material Requirement Planning (MRP)**

MRP is a manufacturing planning too. It is a computer based production and inventory while ensuring that adequate materials are available for production. MRP performs three functions.

I. Ordering planning and control: When to release orders and what quantity.

II. Priority planning and control: How the expected data of availability compares to the need data of availability compares to the need for each item.

III. Planning: Capacity requirements and development of broad business plan.

Although the principles of MRP can be applied distributing job shop and process industries, it fit best of standard products like automobiles and electrical equipment.

- **Manufacturing Resource Planning (MRP*)**

While MRP addresses the inbound flow of inventory, MRP adds Finance, marketing and integrate logistics like MRP and MRP is a push inventory model. However, it adds the basic model.

MRP considers not only the inbound flow materials but also plant capacity. Additionally, it handless production scheduling, labor needs and inventory budgets, MRP benefits could include shortage and stock out, which should increase customer service, improve delivery, allow better response to demand changes, reduce inventory levels and costs and allows more planning flexibility.

Distribution Requirement Planning (DRP)

DPR applies MRP principles to the flow of finished goods to field warehouse and customers. Although MRP improved materials requirement planning by taking into account both materials management and production scheduling. It failed to account for this out bound movement. DPR adjusts ordering patterns of inventory needs and better deals with product availability and receipt timing.

B. Pull Inventory Model:

Pull Inventory models are based on making goods once customer demand is know. The product is pulled through the channel of distribution by the order. Recent trends suggest a movement to use pull inventory models to reduce inventory throughout the channel JIT and Kanban are the most widely used pull inventory model.

- **Just-In-Time Inventory Model**

  JIT is disciplined approach to improve manufacturing quality, Flexibility and productivity through the elimination of waste and total improvement of people.

  There are three components to JIT. First is JIT purchasing, which ensure that the materials arrive short that production can immediately use them. Next is JIT manufacturing, which produces finished goods for immediate shipment, subassemblies for immediate shipment, subassemblies for immediate assembly and fabricate parts for immediate use in subassemblies. Last is JIT delivery, which transports goods to meet the tighter transit times and reliability standards of JIT operations. All three JIT components must work together for a company to benefit for them.

- **Kan Ban Pull Model**

  The Kan Ban means "Visual Record" and is the production control system, allowing production with smaller inventories. Kan Ban is also referred two card system, a single card Kan Ban and two cards Kan Ban.

1. **Single Card Kan Ban**

   The single card Kan Ban system used only a conveyance (move) Kan Ban and no production Kan Ban. The single Kan Ban is most common used in Japan (Shrestha and Silwal, 2057).

Two card Kan Ban

Inventory is usually controlled at 1000 levels by using a manual two card Kan Ban system. One card is conveyance Kan Ban, the requisition and authorization of transparence of materials from supply center to work center. A second card the production Kan Ban authorizes the production of materials.

2.5 Techniques of Inventory Management

There are mainly two considerable questions when managing inventory. First, how much should be ordered and second when to order? Due to friction and uncertain market, Since 1970s the cost of inventory as a buffer stock has been extensively developed to solve the inventory problem. But each company has to develop its own systematic, analytical approach rather than borrowing techniques and formulas (Moryan James).

The question, how much to order, relates to the problem of determining economic order quantity, and is answered with an analysis of cost of maintaining certain level of inventories. The second question, when to order, arises, because of uncertainty and is a problem of determining the re-order point (Pandey, 1994).

In every aspect of inventory management, there is necessary control of inventory. There are various techniques of inventory control to avoid excess cost, physical loss, damage, theft over inventory and lower inventory; some of these techniques are discussed as below.

2.5.1 Economic Order Quantity (EOQ)

Economic order quantity is the quantity of goods ordered which minimizes total annual cost of inventory. Economic order quantity equals carrying cost and ordering cost of inventory. This mode determines the optimal order quantity of individual items of inventory given its forecasted wage, ordering cost and carrying cost. Economic order (EOQ) can be computed as follows

a. **Formulae Method**,

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

Where, A= Annual Demand / Requirement/Sales

O = Ordering cost per order

C = Carrying/ Holding cost per unit per year

b. Trial and Error Approach

This is another approach to calculate EOQ. A firm has different alternative purchase policy of its inventory. It can purchase its' entire requirement on one single lot. Alternatively, the firm can purchase its inventory in small lots periodically say weekly, monthly, bimonthly, half yearly and so on. It means more than one time the firm can place in order to purchase inventory so this method is known as Trial and Error methods.

According to this approach the carrying and ordering cost for a different sizes of order to purchase inventory is computed and the order sizes with the lowest total cost (ordering + carrying cost) of inventory is EOQ (Khan and Jain, 2003).

Total Cost of Various Orders

No. of Order	**1**	**2**	**3**	**4**	**5**
Order Size	2500	1250	833	625	500
Average quantity	1250	625	417	313	250
Carrying cost	2500	1250	833	625	500
Ordering cost	100	200	300	400	500

Where,

No. of orders = Increase no. of order decrease order size.

Order size = Annual requirement divided by no. of orders

Average inventory = (Equal to half or order size)

Ordering cost = (ordering cost per order x No. of order)

Carrying cost = (Average inventory x Carrying cost per unit per year)

Total cost = (Ordering cost + Carrying)

c. The Graphic Approach

The economic ordering quantity can also found out graphically. Figure 2.5 given below illustrates the EOQ function. In the figure, carrying, ordering and total costs are plotted on vertical and horizontal axis is used to represent the order size. Total carrying cost increases as the order size increases, because on an average, a

large inventory will be maintained and ordering costs decline with increase in order size because large order size means loss number of orders. The behavior of total cash line is noticeable since it is a sum of two types of cost, which behave differently with order size. The total cost decline in the first instance, but they start rising when the decrease in average ordering cost is more than offset by the increase in carrying cost. The EOQ occurs at the point Q where the total cost is optimal. Thus, the firms operating profit is maximized at point Q.

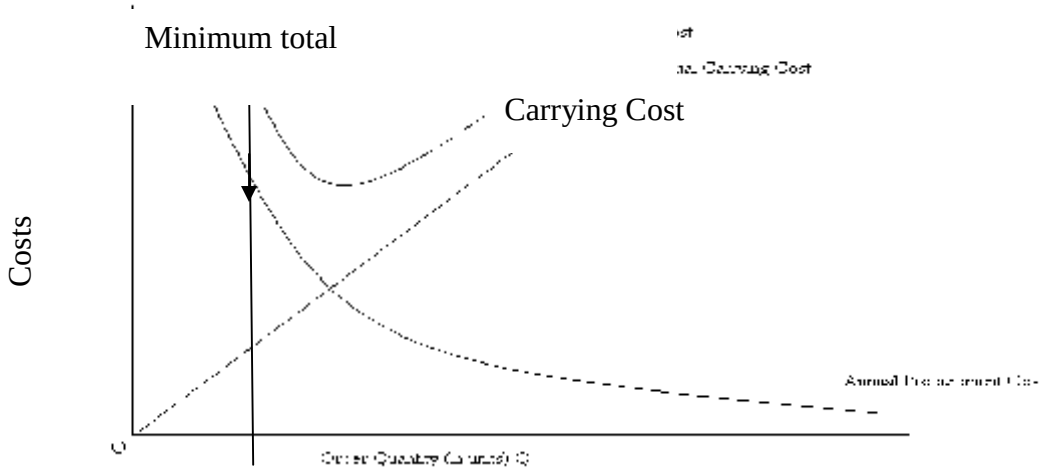


Figure No. 2.1: Graphic Approach of EOQ

It should be noticed that the total cost of inventory are fairly insensitive to moderate changes in order size. It may, therefore, be appropriate to say that there is an economic order range, not a point. To determine this range, the order size may be change by some percentage and impact on total cost may be studied. If the total costs do not change very significantly, the firm can change EOQ within the range without any loss (Pandey, 2002:888).

2.6 Role of Inventory in overall Profit planning of the Organization

Profit planning and control (PPC) is important approach developed for effective management system mainly in profit-oriented organization. Simply planning

is the process of forecasting for future time period. It shows the direction for the organization where to go and how to go to accomplish the certain objective made by the organization. Without making appropriate plan, the organization can't reach its destination. A profit plan or budget is comprehensive and coordinated plan, express in financial terms for the operation and resources of enterprises for some specific period in future. Profit planning is the part of overall planning. PPC includes comprehensive, coordinated, financial terms, resources plan time etc.

For appropriate profit planning of the organization it has to prepare different budgets like sales budget, production budget, material purchase budget, material usage/consumption budget, open to buy budget, labor hour budget, labor cost budget overhead budget (manufacturing as well as non manufacturing overhead), flexible expenses budget, capital expenditure income statement, budgeted balance sheet, activity based budget, cost volume profit analysis (CVPA), etc.

2.6.1 Inventory and Production Budget

Production Management deals with inventory because first thing for production is the raw material. A firm can't achieve its goal unless inventory is controlled efficiently and capital is allocated efficiently. Therefore study on inventory is the necessary thing for the co. Therefore study on inventory management is a great important.

Simple production means the creation of utilities in goods and services. The organization has to produce different goods and services mainly for production and sales. Inventory budget is one of the important components of production budget. Future is uncertain so production has to be made inventory also. Inventory has direct relationship with production budget. Without making appropriate inventory polices, the organization can't prepare production budget

Production budget

Sales units for the period	******
(+)Closing inventory (inventory at the end)	******
Total requirement for the period	******
(-)Opening inventory (beginning inventory)	******
Production units for the period	**********

2.6.2 Inventory and Purchase Budget

In order to maintain Coordination between material usage and inventory level; of raw material and raw material/ parts purchase, the organization has to plan and control materials. For this the organization has to prepare the material usage or material consumption budget and material purchase budget. Thus inventory has also direct relationship with material consumption budget and material purchase budget. Purchase budget. The organization can't purchase material whenever it is needed. So, organization has kept sufficient stock or inventory of material for smooth operation of the organization.

Material Usage / Consumption Budget = production Budget* Standard Usage rate

Material Purchase budget

Material Usage units for the period	******
(+)Closing inventory (inventory at the end) of material	******
Total requirement for the period	******
(-)Opening inventory (beginning inventory) of material	******
Material Purchase units for the period	**********

Before prepare to materials purchase budget, the organization has to consider the following points.

i) Units to purchase: Material usage ± inventory

ii) Timing for purchase or reorder level (ROL): Replacement stock + safety stock Or , Lead time stock + safety stock

Or, ROL= (Lead time* Daily Consumption) + Safety Stock

Where,

Lead time= time gap between order and receive

iii) Economic Order Quantity (EOQ)

It determines optimum quantity to be purchased. Similarly for non-manufacturing organization, it has to prepare materials purchase budget and open to buy budget.

Where,

Purchase Budget = Sale + stock at the end+ reductions (discount, mark up, loss on storage, damage, demurrage, water, paste, mice, obsolesces, shoplifting, etc) - stock at the beginning.

Open to buy budget = Stock needed- stock available

Where, Stock needed= budgeted sales for the period + budgeted reduction +stock at the end - (actual sales to date + actual reduction to date)

Stock available = stock at the beginning + Merchandise /stock received today + merchandise order for the period delivery - (Actual sales to date +actual reduction to date)

2.6.3 Coordination between sales, production and inventory

The manager must plan an optimum co-ordination between production, inventory and sales. An efficient co-ordination production plan is necessary for optimum production and sales. There may be high pressure from both sales and manufacturing for high inventory level. The production budget and inventory policies provide the basis for obtaining this co-ordination.

Production manager must translate the quantity in the sales budget into unit production requirement for the budget period for each product while considering the management of inventory policies. An efficient plan should present the optimum co-ordination between sales budget, essential inventory levels and production levels.

2.7 Responsibility of Production Manager

In the present day of cut throat competition at various stage of production an enterprise should produce goods and services keeping into consideration for the requirement and satisfaction of potential customer. The objective should be to produce goods at least cost and to maximize satisfaction of the buyer. The production manager assembles appropriate resources and direct use of those resources, which may b man, machine, material, capital processes, etc. Thus “manager has to pay more attention not to what their customers might buy also to increasing government regulation and behavior of customer and environment protections group” (Goel 1992:61).

The main responsibility of the production manger can be presented as:

- Producing right quantity of material right time
- Should concern with production planning
- Fully responsible product and quality control
- Capable to select the most efficient and economical method to perform to operations

- Plant layout and material handling
- Use of proper inventory model
- To find the relationship between output and input, etc

2.8 Method of Inventory computation

We can calculate inventory by different methods. Mainly the organization can compute inventory by following methods. (Welsh, Hilton and Gordan, 4'th edition: 61)

1. Average sales method:

This method can be divided into 2 categories

i) Average sales method:

Under this method inventory is calculated with average sales of certain time period

$$\text{Inventory} = \frac{\text{Yearly sales/total sales during theh time period}}{\text{No of time period or 12}} \times \text{requrie stock of period}$$

It is stable and suitable to basic product but it can't be used in big organization.

ii) Moving Average Method:

It is based on uneven no of period mostly 3, 5 or 7. Under this method inventory can be calculated as,

$$\text{Inventory} = \frac{Sales\,(\text{Pr}\,evious\,months + current\,nonths)}{Total\,no\,of\ \ preiod}\ x\,require\,no.of\ \ month$$

Under this method, both inventory and production are fluctuating. It is appropriate in those organizations, whose sales are highly seasonal.

2. Sales to turnover Ratio

This method is also two types.

i) Historical Sales Turnover Ratio Method:

This method is also called HSTR, Turnover method or withdrawn method. Under this method inventory is calculated on the basis of historical ratio of sales to inventory.

Inventory = Sales for the period * HSTR or Multiplier.

Where,

HSTR = Historical sales Turnover Ratio

$$= \frac{No.of\ month\ in\ a\ year\ or\ 12\ (N)}{Turnover\ Time\ (TT)}$$

and TT = $\frac{Sales\ (historical)\ for\ the\ year}{Average\ Inventory}$

Average Inventory = $\frac{Opening\ inventory + clo\sin g\ inventory}{2}$

It is stable and shows the relationship between sales and inventory.

ii) Turnover Time Method:

Under this method, inventory can be calculated as,

Inventory = $\frac{Total\ Sales\ /\ Budgeted\ sales\ \ for\ the\ year}{Turnover\ Time}$

Mostly it is used for stable inventory polices.

3. Proportional sales method:

It is not widely used. Mostly it is used in small industry or basic product/commodity or monopoly market, which has certain sales. Under this method inventory can be calculated as,

Inventory = Sales for the month * given ratio

2.9 Determinants of Inventory policies

Inventory polices or levels are affected by different factors. Sometimes the organization has kept more inventories where as in some times it has to kept low inventory levels. Some major determinants of inventory level are as follows:

i) Types of market

Sales season affects inventory policies. In peak season the organization has to kept high inventory whereas in slack season it has to kept low inventory. So organization has to keep inventory according to types of market or sales season.

ii) Types of productions:

For necessary product, inventory is stable or it has to kept low inventory whereas for luxuries goods high inventory is required. So while determining inventory level, organization has to consider regarding the types of products.

iii) Life or products:

If goods are perishable, low inventory is required but for durable goods the organization can kept high inventory. So the life of the product affect in determining inventories policies.

iv) Processing time:

If production/process time is long, high inventory should be kept otherwise organization has to keep inventory in fluctuating level.

v) Establishment cost:

If pre-production or Establishment Cost is high stable inventory is better otherwise organization has to keep inventory in fluctuating level.

vi) Availability of capital:

If sources of capital are cheap and sufficient, it can be kept high inventory. And if sources of capital are mote expensive or scare, organization has to keep low inventory level.

vii) Storage facility:

If the organization has its own and ideal store, it can be kept high inventory otherwise it has to keep low inventory level.

viii) Storage Risk:

If loss on storage like obsolesces, season off, out of fashion, loss due to fire, theft mice paste, decrease in price, lifting by employee, it has to kept low inventory otherwise it can be kept high inventory.

ix) Availability of Raw materials:

If material are easily available in the market, it can be kept low inventory otherwise it should be kept high inventory.

x) Reorder point:

If reorder point is long, the organization has to kept high inventory but if re order time is long is short organization has to keep high inventory level.

2.10 Importance of Inventory Management

A company should maintain adequate stock of raw material for continue supply to factory and uninterrupted production. It is non-possible for the company to produce raw material whenever it is needed. A time lag (lead time) exists between

demand for material and its supply. The procurement of raw material may delayed because of such factors as strike, transport, disturbance, short supply of raw material may delayed because of such factors as strike, transport, disturbance, short supply of raw material, at given time to stream line production. Other factors, which may necessitate purchasing and holding of raw material, inventories are quantity discount and anticipated price rise in future. The firm may purchase large quantity of Raw material then needed for desired production and sales level to obtain quantity discount of bulk purchasing. The firm would also like to accumulate raw material in anticipation in price rise in future.

The importance of inventory management and need for the coordination of inve4ntory decision and transportation policies, has long been evident. Unfortunately, managing inventory is complex supply chain is typically difficult, and may have a significant impact on the customer services level supply chain system wide cost "inventory represent the major element in the working capital of many business under taking and accordingly requires substantial investment in inventory can be minimized, desired inventory levels can be maintained for smooth production operation and increased consumer satisfaction and total inventory cost can be minimized" (Agrawal, 1975:20). Material research purchase intelligence, market research, management information system, right information system, creative purchasing, and material intelligence after offer used in the control of scientific inventory management, but a major handicap in purchasing in the lack of coordination of activities and material research is the most rejected aspect in many organizations. The four decades of industrialization in the country made the buyer shoulder heavy responsibilities, purchase. Researches helps in visualizing the underlying possibilities, within the economy and hence comes out with a future vision, forecasts and future problems and suggest suitable solution in a scientific manner.

Inventory management is an important function of an organization cover various aspect input process, i.e. it deals with raw materials, procurement of machines and other equipment 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 time. It is also concerned with market exploration for the items be purchase to have up to date information, storage

and stock control, inspection of the material received in the enterprise, transportation and material handing operation related to materials and many other functions (Goel, 1992:294).

It is already stated that inventory management is important for proper inventory handing system. It is important that models of inventory system reflect true incremental cost associated with alternate plans or policies; their cost represents out of pocket expenditures or forgone opportunities of profit. Cost figures derived from the normal accounting records usually don't fit the requirements. The following type of cost items are often incremental cost in inventory models; cost depending of the number of the lots, production costs, handling and storing cost of storage and capital investment costs.

"The importance of inventory management can be realized when it is said that purchase account for nearly 50 percent of an organizations annual expenditure. That nearly 80% of working capital is tied up in inventory and the carrying cost is almost 25% a year. That materials represent 40 to 60 percent of sales price or 60 to 80 percent 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" (Nair, 1994:240).

The above different writers view shows the importance of inventory management. Therefore, inventoried are use to separate purchasing and selling with help of inventory management techniques to avoid losses of sales, gain quantity discounts, reduce ordering cost and achieve the efficient production. If the organization is not paying attention to inventory management, it will affect the efficiency and profitability of the organization.

2.11 Reasons for carrying inventories

Inventory management is as much important as the management of receivable for the reason that investments in their two types of assets generally account for more then two third of the total investment in current assets. Business firm could make profit if they do not have to hold any inventory. Unfortunately, with the exception of some firms in the service industry/firm, hardly get the blessing of running business without holding a minimum level of inventory. Manufacturing firms need to hold the inventories to assure interrupted business operations. However, many of them hold for some other purpose too. For example, raw materials are stock for the current

production plan, to meet seasonal peaks, to avoid price increase, to economize the ordering costs, etc (Pradhan, 1992:181).

The fundamental reason for carrying inventories is that it is physically impossible and economically impractical for each stock item to arrive exactly when it is needed. The manufacture must therefore keep extra supplies of raw materials inventory to use when they needed in the conversion process.

Other reasons for carrying inventories are given below

(a) Primary Level

- Physically impossibility of getting right amount of stock at exact time of need.
- Economical Impracticality of getting right amount of stock at exact time of need.

(b) Secondary Level

Organization has to carry inventory because of following reasons.

i) Return on Investment and Turnover:

Inventory should be viewed as an investment and should complete for funds with other investment opportunities. Firm should invest in those opportunities where return is greater than capital costs to borrow.

Both manufacturing and service firm are interested in return on investment, alternatively called return on assets, employed. Return on assets is the ratio of profit to assets which is shown on given formula.

$$\text{Return on Assets} = \frac{\text{Profit}}{Assets} = \frac{\text{Profit}}{Sales} \times \frac{Sales}{Assets}$$

The ratio of profit to sales is mark up and the ratio of sales to assets is turnover. Now, we see that one way to improve return on investment is to increase turnover. We went to sale those assets that are in inventory over and over again in a reasonable time frame. One way to do this is to keep the assets in inventory low, thus, improving the chance of high inventory turnover.

ii) Buffer Stock:

When demand is unusually variable, some protection is needed against the prospect of high stock out cost. Inventory can be used to “Buffer” against such uncertainties. Likewise, lead-time, the time between ordering and receiving goods, is

not always constant. Buffer stocks can be used to protect against stock outs from uncertain demand during least-time.

iii) Decoupling:

Inventories are also useful when they decouple operation- that is, when they break operations a part so that one operation supply is independent of another supply. This decoupling serves two purposes. First, decoupled operation means that break down's, materials shortage or other production fluctuation. At one stage of operation do not cause later stages of operation to shut down. A second purpose of decoupling through inventories is that one organizations unit can schedule its operations independently of another. In automobile manufacturing for example, engine build up can be selected separately from seat assembly, and each can be decoupled from final automobile assembly operations through in-process inventories.

iv) Production Smoothing:

Inventories can also help to level of production. When we examined aggregate planning and scheduling and products can be built during stock demand periods and used in Peak demand periods. Thus high cost of production rate and work force level changes can be avoided.

v) Material Handling

For some operation, accumulating parts between operations can reduce material handing cast. It is particularly true of intermittent systems, since they involve automation of material handling then do continuous system parts can be accumulated and inventoried in total boxes or baskets and transported by hand jack dollies or forklift trucks much more economically than they can be carried by hand. In continuous manufacturing, automated material handing systems are designed to reduce overall handling cost, resulting in less WIP.

vi) Bulk Purchase:

With bulk purchases, quantity discount can be arranged thus a cost advantage of material inventories is realized. Supplies of materials that achieve economies of

scale by producing or transporting large volume offer quantity discounts (Adam and Ronald, 1992:136).

2.12 Procedures of inventory management

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

2.12.1 Purchasing

I) Meaning of Purchasing

The process of inventory management in fact begins with purchasing. The need for particular materials initiates purchasing in a firm. Purchasing in narrow sense refer merely to the act of buying an item at a price and in broader sense purchasing makes its a management activity that goes beyond the simple act of buying and including the planning and policy activities research and development service section. Management suggests that purchasing decisions involve the weighting of alternatives possibilities and may involving of these alternatives may influence to the other function of the purchasing decision. 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 from the right origin at the right time and cost. Purchase management should be effective otherwise it hamper in the quality of production. If 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 objectives and policies. The efficiency of any business activity depends upon having material, supplies and equipment available in proper price. We can improve management of purchase by the help of standardization, value analysis, material substitution, transportation saving and cost reduction of packing modification.

For most organization, supply management means purchasing, that is, firms buy goods to resale, to carry out operation, or to manufacture products. Supply management is usually given the broadest definition, encompassing an activity involved in moving goods into a firm. Other terms have similar meaning: "Regardless of the terms, supply management or purchasing aims at anticipating requirement,

sourcing and obtaining supplies, moving supplies into the organization and monitoring the status of supplies as a current assets" (Bloomberg Hanna, 2002:16.3).

Purchasing also known as procurement, Procurement is the process by which companies acquire raw materials components, products, services and other resources from supplies to execute their operations. Sourcing is the entire set of business process required to purchase goods and services. Sourcing process include the selection of supplies, design of supplies contracts, product design collaboration, procurement of material and evaluation of supplier performance.

A good supplier scoring and assessment process must identify and track performance along all dimensions that affect the total cost of a using a supplier. Supplier selection uses the output from supplier scoring and assessment to identify the appropriate supplier. Given that about 80 percent of a cost of a product is determined during design. It is crucial that suppliers be actively involved in this stage. Once the product has been designed, procurement is the process in which the supplier sends product in response to orders placed by the buyer. The goal of procurement is to enable orders to be placed and delivered on scheduled at the lowest possible overall cost.

Purchasing activities related to procuring materials and supplies during production. The purchasing function, which provides materials, supplies and services from outside vendors, Accordingly, "Purchasing is an important boundary function that supports operations by acquiring major resources for the conversion process" (Hampton, 1930:228).

Purchasing function in any organization is concerned with the cost of materials purchase. Therefore the purchasing agent has and important role in industry for purchasing. Purchasing department which is the only department that deals with both the materials and cost should be recognized as the value expert of the organization.

Purchasing now has become a specialized function in many organizations. Vesting express that “purchasing is a managerial activities that goes beyond the simple act of buying and includes the planning and policy, objectives covering wide range of related and complimentary included in such activities are the research and development required for the proper selection of materials and sources from which these materials may be bought.

Thus purchasing in modern sense is a strategic managerial function and negligence will ultimately result into decrease in profit.

II) Objectives of Purchasing

The objectives of purchasing should confirm the overall objectives of an organization. The objectives of purchasing are like the objectives of integrated logistics. The efficient acquisition of products and services requires the right material, in right quantity, in right condition, at the right time, from the right source, with the service, and the right price.

More explicitly is expected to accomplish nine items (Bloomberg & Hanna, 2002:481).

(a) Provide an uninterrupted flow of materials, supplies and services required to operate the firm.

Raw materials and components parts must arrive when required. Shutting down production lines may hurt employees and customers and certainty increases total costs.

(b) Minimize Inventory Investment and Loss

The cost of carrying inventory reaches as mush as 50% of the value of product. Inventory carrying cost typically ranges between 20 and 30 percent of the value of product.

(c) Maintain Adequate Quality Standards

The quality of firm's product may be Ltd. by the quality of purchased materials. It is easy to lose sight of quality when attempting to control purchasing costs. Therefore, it is almost important that quality standards not be compromised solely for lower price.

(d) Find or Develop competent Suppliers

Good suppliers help to solve many purchasing problems. It is a primary goal of the purchasing manager to locate and attract quality suppliers.

(e) Standardize, where ever and whenever possible, the items bought when ever possible

Standardizing materials can reduce inventory (Fewer parts), carrying cost and may allow for purchasing at quantity-discounted prices.

(f) Purchased required item and services at the lowest ultimate price

This does not mean that the lowest dollar cost is automatically accepted. Price may be defined as the time, effort and money needed to obtain an item. The non-monetary

costs may depend on services, materials quality, quantity needs and delivery departments.

(g) Improve the organization's competitive position

Purchasing can assist the firm's competitive position by ensuring that the right materials are bought at the lowest ultimate price. This cost guarantees that the materials will be available when required. Also, purchasing can develop relationship with supplies that ensure a continued flow of materials in spite of conditions that negatively affect the supplies of competitors.

(h) Work harmoniously with the department in the organization

Purchasing does not stand-alone. It affects nearly every facet of the firms operations. Therefore, it is very important that purchasing and the other departments communicate effectively with one another, and they co-operate to solve common problems.

(i) Accomplishing the purchasing objectives at the lowest possible level of administrative costs

Like any other activity or department, purchasing incurs costs in its operation such as supplies, telephones, travel and computers. However, these operating costs should be controlled efficiently and effectively.

These objectives fit the overall objectives of integrated logistics which are to provide desire customer service levels while minimizing total costs.

III) Procedures of Purchasing

"Effective purchasing means learning the purchase requirements, identified qualified sources of supplies, minimizing to total cost of supplies and administrating the purchase" (Adam & Ronald, 1992:221). While individual purchase may appear quite different, this is general underlying purchasing process. The process is described below (Bloomberg & Hanna, 2003:451).

(a) Recognized a Need:

In organizations, need are recognized in many ways. A department may control to buy new production equipment. Purchasing may be notified of an order for component parts by the material requirement planning system. Orders may be placed through an electronic data interchange system and simply reviewed by purchasing. Each of these methods starts the purchasing process at same level, once the need has been identified.

(b) Identifying a Supplier

Identifying the supplier may be simple as making sure the e-mail address is correct on electronic orders or as complex as asking for pre-proposals on major capital equipment, conducting a bidders meeting and evaluating many detailed proposals. To some extent, this depends on the type of purchase new buy, straight re buy, or partial re buy and the product or service being purchased. Once the potential suppliers have been identified, one or more will be chose to provide the goods.

(c) Qualifying and Placing an Order

Once a supplier has been identified, the order must be initiated, contract signed, or some step taken to get the goods delivered or service provided. Purchasing is usually then responsible for determining, if orders are filled correctly, if contract items are met, if goods meet standards and if supplies perform satisfactorily.

(d) Monitoring and Managing the Delivery Process:

Primarily, purchasing makes sure that correct goods were delivered in the correct quantity at the right place. If not, purchasing takes some action to fill the gaps.

(e) Evaluating the Purchase and the Supplier:

This is a two-stage process. A particular purchase may go well or poorly. Most purchasing organization summarizes the accumulated experience with a supplier through many transactions and many purchases. When one transaction goes awry, purchasing may contract the supplier to avoid future problems. When many transactions fail to meet standards then purchasing seeks new suppliers.

2.12.2 Receiving and Store Keeping

After some time of placing the order, follow up process starts to get quick delivery of the items. At the time of delivery the purchasing department receives the items and received items are compared with purchase order and actual material received which should be entered in goods received note. Then all items received by the purchasing department should be passed into store for protection against deterioration and pilferage. They are stored in such a way that, their location is easily identified at the time of issue. “The store function involves both keeping and store of materials and keeping the store records, the former being physical task and the later being accounting task, depending the nature and requirement of the organization. The store is classified as centralized and decentralized store” (Agrawal, 2000:21).

In the word of Maynard, the duties of store keeping are to receive materials to protect than while in storage from damage and unauthorized removal to issue the material in the right quantity at the right time, to right place and to provide these services promptly and at least costs.

When we refer to stores here, we mean those materials are used in the product or which are consumed in production operations. Verifying and receiving incoming materials is a naturally of storekeeper's responsibility for their safekeeping. Responsibility for proper storage materials is naturally associated with store keeping. This includes protection against physical damage from handling, decay or corrosion from exposure and shrinkage of quantity. The store keeper may also assume charge of potentially useful materials for which there is not strict accounting. These include excess and absolute materials for which future uses may be found, these by guarding against waste.

The problem of storage is not only that of safe keeping; stores must be quickly and conveniently available to the consumers. The optimum location is often adjacent to there where the materials are actually used. This reduces delay and cost of handling and relieves internal traffic congestion. For this reason, decentralized storerooms are often provided near various production centers. In some cases, materials are stored without protection on the production floor, immediate accessibility being more important than possibility of loss.

Inflammable or explosive materials enamel thinners and gasoline should be kept apart from the main building in tanks or sheds. Highly polished or delicate parts should be stored in dry, clean places and protected from too much pressure or rubbing against each other. Some papers, textile materials, and plastic films may require temperature and humidity control. Valuable metals, like platinum, must be protected against theft. Heavy loads, like piles of sheet steel, require adequate floor strength. In any case, the decision as to location depends, on physical requirements, convenience, safely and the economics of storage and handling cost.

Store keeping should be given outstanding place in the organization. Otherwise mishandling of goods, wastage in storing and handling will add to the cost of production. The importance of store keeping has not been properly recognized by the manufacturing organization so far. Many organizations speed lavishly on machines and wages whole storekeeper is ignored and store housed in camped quarters, ill equipped and ill ventilated. Storekeepers are also ill paid in comparison to

others in similar status. All these causes are responsible for wrong or short issues, loss of stock of raw materials, unexpectedly running of stock and preparation or incorrect vouchers, all these led to left and pilferage of stock and delay in production.

In the light of above explanation storekeeping can be described as the keeping of materials in stores in a scientific and systematic way.

(I) Objectives of Store Keeping

The major objectives of storekeeping may be stated as follows:

- Receiving, handling and issuing goods economically and efficiently.
- Storage, using the available space and labor effectively.
- Protections of all goods in stores against all losses from fire, theft and obsolesce.
- Minimizing the investment on inventories.
- Maintaining regular supply of raw materials of all times when properly authorized.
- Facilitating ordering of required materials.
- Minimizing the inventory handling cost.

To achieve the above mentioned objectives a firm generally uses different types of controlling devices like:

(a) Bin Cards

A bin card makes a record of receipt and issue of materials is kept for each item of stores carried. These cards are maintained by the storekeepers and storekeeper is answerable for any difference between the physical stock and the balance shown in the bin card. These cards are used not only recording receipts and issues of stores but also assist the storekeeper to control the stock.

For each item of stores, minimum quantity, maximum quantity and ordering quantity are stated on the card. By seeing the bin card the storekeeper can send the materials requisition for the purchase of materials in time.

Sample of Bin Card

Bin Card No: Bin No:

Name of the Articles: Maximum quantity

Code No.: Minimum quantity

Store Ledger folio: Ordering quantity

Date	Receipts		Issues		Balance	Date of checking	Remarks	Goods on order		
	Goods rec. note no.	Store requisition note no.	Store requisition note no.	Qty	Qty			No. & date of order	Qty	Date of goods received

This ledger is kept in the costing department and is identical with the bin card except that receipts issues and balanced are shown with their money values. This contains an account fir every time of stores and makes a record of the receipts, issues and the balances, both in quantity and value. Thus, this ledger provides the information for the pricing of materials issues and the many value at any time of each items of stores (Jain & Narang- 1991).

Sample of Store Ledger

Name of Article Maximum quantity

Code No. Minimum quantity

Bin No. Ordered quantity

Date	Receipts				Issues				Balance			Remarks
	S.N.	Qty.	Rate	Amt.	S.N.	Qty.	Rate	Amt.	Qty.	Rate	Amt.	

2.12.3 Issued and Pricing

Each item of the inventory has some value associated with it. This value depends on the price duration of the item inside the inventory: procurement cost, storage cost etc. Pricing the inventory is one of the most interesting and widely concerned matters in accounting process. Many organizations are interested in various method of pricing inventory because it has a direct affect on the income. Inventory valuation approach is important in the aspect of income tax problem.

A basic function of the storekeeper is to issue materials as required. The function should embrace prompt efficient service and the accurate recording of each transaction. The vouchers that support each material's issue may include some form of requisition that specific quantity, time and place of the delivery. The requisition should indicate proper authorization and the account or to which material cost is to be charged. When materials are issued from the storeroom on requisition, there cost is deducted from the inventory balance.

There are many method of inventory valuation but must significance method is cost and other method is lower of cost of market. Both methods give different results.

Cost Basis for inventory valuation

The primary basis of accounting for inventory is cost which has been defined generally as the price paid to acquire an asset. As applied to inventories, cost means in principle the sum of the applicable expenditure and changes directly or indirectly incurred in bringing an article to its existing condition and location (AICA -1961).

Conceptually, the process of valuation the inventory is simple. We can calculate inventory value that multiplying physical quantity of goods by cost per unit. But in practice, many organizations purchase different types of raw materials at different price and different time.

It is not always possible to identify the individual particular purchase group. At that solution firms have faced difficulties in valuation the inventories. 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

b) Weighted Average Cost

c) First in First Out (FIFO) Method

d) Last in first Out (LIFO) Method

e) Standard Cost Method

f) Base Stock Method

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

2.13 Carrying Cost

Carrying cost is associated with physically storing goods. Once the goods have been accepted they became part of firms inventories prior to the recent period of high interest rates, a number of studies determined that the annual cost of carrying a production inventory ranged between 10 and 34 percent of the value of the inventory, with the model figure running at approximately 25 percent. The escalating cost of money since 1979 however has increased the typical firm annual inventory carrying cost to appropriate 30 to 35 percent of the value of the inventory. Five major elements make up these casts in the following manner.

Opportunity cost of investment funds	12-20%	
Insurance costs	2-4%	
Property taxes	1-3%	
Storage costs	1-3%	
Obsolescence and deterioration	4-10%	
Total carrying cost	20-40%	(Dobler-1992)

Total carrying cost vary in proportion to the value of inventory usually they are computed from the following formula.

Total carrying cost = Average inventory x carrying cost per unit.

Symbolically TCC = Q/2 x C

Where,

Q = Quantity order size

C = Carrying cost per unit

The inventory carrying cost further expressed as:

2.15.1 Elements of carrying cost

(i) Opportunity Cost of Inventory Funds:

This consist of expenses of raising funds (interest on capital) to finance the acquisition of the inventory. If funds were not locked up in inventory, they would have earned a return. This is an opportunity cost of funds or the financial cost and component of the cost.

Capital cost or opportunity cost compares inventory investment to what the firm could earn from other capital investment. In most firms, capital costs are the largest carrying cost category. A firm might use pretax return on investment as a first cut estimate of inventory capital cost (Bloomberg & Hanna 2002:180).

(ii) Insurance Cost:

In spite of best precautions, firm must protect themselves against such hazards as fire or accident in the warehouse. Larger amount or inventory require larger amount of insurance. The insurance premiums represent a carrying cost of inventory (Hampton 1992:19).

(iii) Property Taxes

"As with insurance, property taxes are levied on the assessed value of the firm. Assets; the greater the inventory value, the greater the assets and consequently the higher is the firms tax bill" (Dobler, 1992:19).

(iv) Storage Cost

The firm must provide for storage space, usually through the operation of a warehouse or supply room. The firm must employ workers to clean, count, record and protect the goods. All of these activities dealing with the physical holding of the goods are considered storage cost (Hampton, 1992:233).

(V) Obsolescence and Deterioration

In the most operations, a certain percentage of inventory items spoils, is damaged, is pilfered, or eventually becomes obsolete. No matter how diligently warehouse managers' guard against this occurrence, a certain amount always takes place. With new products being introduced at an increase rate, the probability of

obsolescence is increased accordingly. Consequently, the larger the inventory, the greater is the absolute from source.

2.14 Ordering Cost

Ordering cost consist of order costs, set up costs, or both ordering cost could include preparing and processing the order request, selecting a supplier, checking the stock, preparing the payment and receiving inventory levels. Set up costs refers to modifying the manufacturing process to make different goods. They include personnel costs, as well as capital equipment costs. Many firms use blanket orders to reduce order costs (Bloomberg & Hanna, 2002:161).

The term ordering cost is used in case of raw materials (or supplies) and includes the entire cost of raw materials. They include cost incurred in the following activities.

Requisitioning

Order placing

Transportation

Receiving, inspecting and storing

Clerical and staff

Ordering cost increases in proportion to the number of orders placed. The clerical and staff costs, however do not have to vary in proportion to the numbers of ordered placed and one view is that so long as they are committed costs, they need not be reckoned in computing ordering cost. Alternatively, it may be argued that, as the number of orders is increase. The clerical and staff costs tend to increase. If the number of orders are drastically reduced, the clerical and staff force release now can be used in order departments. Thus, these costs may be included in the ordering costs. It is more appropriate to include clerical and staff costs on a pro-rata basis. Ordering cost increase with the number of orders; thus the more frequently inventory is acquired, the higher the firm's ordering costs. On the other hand, "if the firm maintains large inventory levels, there will be few orders placed and ordering cost will be relatively small. Thus, ordering cost decrease with increasing size of inventory" (Padey, 1994:894).

Firm's usually get discount for purchase materials in large quantity, such discounts help reduction in the unit price of the items purchase, such facilities encourages buyers to place a fewer orders.

Ordering cost is calculated by following formula.

$$\text{Total ordering cost} = \frac{Annaual\ \text{Re}quirement}{Quantity\ order\ size} \times Ordering\ \text{cos}t\ per\ unit$$

Symbolically,

$$\text{TOC} = \frac{A}{Q} \times O$$

Everetle E. Adam, J.R. Ronald & J. Ebert said that inventory costs or cost associated with inventory included following five types of relevant cost (Adam & Ronald – 1992).

2.14.1 Elements of ordering cost

Following items are included in ordering cost.

(i) Cost of Item

(ii) Procurement Costs

(iii) Carrying (Holding) Costs

(iv) Stock out Costs

(v) Cost of Operating the Information Processing System

2.15 Review of related studies

Above, we have emphasized on the review of text books only but attempt is also mode to review the related studies conducted by different agencies, expert, scholars related with inventory management of manufacturing enterprise in Nepal.

Some studies have been made in the subject of inventory management but few studies are review in this chapter.

i). Singa Raj Basnet has conducted the research work on the topic of "Inventory Management: A case study of Himal Cement Company Ltd. (HCCL)". His main objectives are to find present inventory position of HCCL, to find out inventories

management techniques used by HCCL and to provide optimum suggestion regarding inventory management of HCCL.

On his study he found that HCCL is not applying the different methods or techniques of inventory management. There is no proper and up to date improvement in inventory management system in HCCL. Further he recommended that to manage its inventory effectively a firm should use different tools and techniques like EOQ, ABC analysis, re-order level etc. In inventory management, which minimized the inventory cost consequently will result into positive profitability. So it is better to pay attention by top- level management to overall management of purchasing, production, sales and financial dimensions by which HCCL will run in profitability in the future (Basnet – 1999).

ii) Mr. Lila Bahadur Dhital has conducted the research work on the topic of "Inventory Management: A Case Study of Nepal Food corporation" The main objectives of his study were to highlight the NFC's policies and objectives, functions and activities. To analyze the various related variables like purchase, sales food quota of NFC. The findings of Mr. Dhital are under food grains purchasing the domestic purchase are more fluctuated and greater than import. The relationship between edible cereal production and requirement is negative. The total food grains quota is fluctuated in year after year because of production fluctuation in Nepalese kingdom. Mr. Dhital has recommended that some suggestions to improve the present inventory management procedure. The NFC should encourage food production by initiating farmers to produce more food grains. It should facilitate farmers by managing various inputs through co-ordination with concern agencies. NFC must do timely procurement of food grains. Food grains should be stored during harvesting time and should be supplied in areas where there is food deficit. NFC should be released from interference of government as well as political parties. (Dhital – 2001).

iii) Mr. Amrit Kumar Sharma Gaire has conducted a research work in the topic of "Inventory Management: a case study of Royal Drug Ltd." The main objective of his study is to identify the problem underlying in inventory management and control system of RDL. Other objectives of his study is,

To assess the types of inventory maintained in RDL

To examine the techniques being employed to manage the inventory in RDL

To suggest proper inventory model to RDL based on analysis

To find out inventory position of RDL

On the basis of study conducted by Mr. Gaire, the following suggestion has been recommended.

The Co. should define its objective and goals clearly

The Co. should follow all the quantitative techniques and models such as EOQ model, ABC analysis model so that total inventory can be reduced

Ledger cards can also be used to manage inventory in a simple way

General Manager should be professional one and he should not be changed frequently due to political interference (Gaire-1999)

iv) A case study has been conducted by Mr. Surendra Shrestha regarding inventory management of Gorkhapatra Corporation. His main objective is to find out the inventory position of the organization and to provide different suggestion regarding inventory management. He had concluded that Gorkhapatra had not applied any sort of available inventory management techniques to manage the inventory. In the Gorkhapatra Corporation, it is difficult but not impossible to apply the inventory management techniques because of lack of certain data. (Shrestha-1988)

v) Pushpa Raj Baral has also made study regarding "Inventory Management: A case study of Gandaki Noodles Pvt. Ltd" The main objective of his study were to highlight the company's policies and objectives, functions and activities regarding inventory management. Finally he came to know that the factory is following neither economic order quantity model in its purchasing decision nor ABC analysis in inventory management. (Baral- 1994)

vi) A study relating to transport to transport corporation concerning with various aspect has been made by CEDA. The Major objective of the study was to find out present inventory management practices in Transport Corporation. One of the major findings was that though inventory management of this corporation is rather simple but due to the poor management of stocking of spare parts has been hampered the smooth operation of the enterprises. (CEDA- 1973)

vii) Mrs. Radha Kumari Balika had studied about the inventory problem of Hetauda Cement industry Ltd. (HCIL) to find the present inventory position and problem in managing inventory. After his studies he revealed that there is no proper system for material purchase in the industry. And the price and quantity of collected

materials are fluctuating from year to year. The company is not following EOQ model in purchasing decision. The investment in inventory stock of HCIL is in large amount. The value of inventory is increasing from year to year. (Balika- 1996)

viii) Mr. Saroj Rijal has conducted the research work on the topic of "inventory Management: A case study of Agriculture Input Corporation (AIC)". His Main objectives are to find present inventory position of AIC, to find out inventories management techniques used by AIC and to provide optimum suggestion regarding inventory management of AIC.

He observed that the Inventory Management of AIC has no been based on scientific methods adopted by modern organizations of today. For example EOQ method, the reasonable method for calculating number of orders in a year and the size were inapplicable in AIC because of uncontrollable variables, like daily fluctuation which is to be born while importing inventory components like fertilizer, insecticides and implements. There are also controllable variables like procurement practices, absences of different cost required for EOQ Ltd. storage facilities with AIC. For these variables AIC seems passive to do any exercise to improve inventory management situation of AIC. (Rijal - 1997)

Dr. Govinda Ram Agrawal has made a study relating to the Nepalese public Enterprises, which state that inventory management is the weakest aspect of the management. The tools and techniques for controlling inventory have not been applied in Nepalese manufacturing Enterprises for controlling their physical as well as their financial dimension (Agrawal- 1980)

Mr. Vijaya Sharma on his study of Inventory Management of AIC Regarding Seeds indicates that the inventory turnover ratio is an indication of the efficiency of Management. The very low inventory turnover ratio of wheat seeds shows an inefficient inventory management system (Sharma- 1999)

Mr. Krishna Narayan had conducted the study on the topic of "Inventory Management of Royal Drug Ltd." His study state that to achieve the objective of Royal Drug Ltd., the efficient management of inventory is essentials. He revealed that to achieve the object of Royal Drug Ltd, the efficient management of inventory is essentials. If the royal Drug Ltd. applies the scientific technique of inventory management, certainly it

will achieve its objectives very successfully. He further suggested purchase plan should be should be prepared for different types of raw material with proper Co. ordination and cooperation among the planning, purchasing storing, producing, market, selling etc. to avoid the excessive investment on inventory. He also recommended that for purchasing various types of raw material and inventory the Company should use scientific inventory management techniques to minimize total inventory cost i.e. carrying and ordering cost (Shrestha- 2000).

Ram Saran Pandey on his degree thesis on Gorkhapatra corporation stress that for a good inventory system, to maintain suitable level of inventory, so as to able to fulfill the corporation's requirement on time. The rules for maintaining proper stocks of inputs as discusses previously are necessary to know the answer about how much to buy and when to buy. More ever it is evident from previous discussions that the unnecessary cost involved in ordering and carrying can be reduced to a certain level by using the model formulas, etc (Pandey- 2000)

Bishnu Pradhan has conducted a study on Significance of inventory Management of Nepalese Manufacturing Enterprises. He had studied the ratio of inventories to total assets computed for selected non-financial Nepalese enterprise. One of the important findings was to invest on average about 22 percent of total assets in the form of inventories in 2000/01 by Nepalese enterprises indicates that large amount of money has to be invested in the form of inventory. Hence, the inventory management has greater significance. (Pradhan- 2000)

Saroj Sigdel had conducted the research work regarding “Inventory Management of Agriculture Corporation" Sated that AIC is not using scientific model of inventory management. Although they don’t calculate EOQ for the supply of chemical fertilizer, they order lots of 1000 to 20000 M. ton. There is no evidence of taking discount by AIC. Lead time is not calculated properly, Re order point is also not fixed. Regarding buffer stock, although AIC have capacity of sufficient warehouse through out the country, it remains out of stock in season and overstock in out of season. AIC is not using ABC analysis also. (Sigdel-2002).

Puskar Bajracharya has conducted his study on management in Public sector manufacturing Enterprises in Nepal. The main objectives of his study are to find out

the different problems faced by public sector manufacturing organization in Nepal. One of the important findings was the inventory management suffers from the lack of planning, high carrying cost, poor record keeping and store management and virtual absences of controlling system. (Bajracharya- 1983).

Chapter 3
RESEARCH METHODOLOGY

3.1 Introduction

Research methodology is the process of arriving at the solution of a problem through a planned and systematic dealing with the collection, analysis and interpretation of the facts and figures. The objectives of this study are to comparatively analyze the inventory management of Unilever Nepal Ltd and Dabur Nepal Pvt. Ltd and its impact on profitably.

This chapter presents research methodology adopted in achieving the objectives stated in the earlier chapter. This chapter contains nature of research, nature and sources of data information, data gathering procedure etc.

3.2 Research Design

"A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy procedure." (Kothari- 1990: 39) Research design is the plan, structure and strategy of investigation conceived. So as to obtain answers to research question and to control variances to achieve of the study, description and analytical research design have been used.

This study is entitled, "Inventory management" This study deals with UNL Ltd and DNPL Ltd. Only material collection, consumption and inventory position of product groups are variables under the study. This study is based on primary as well as secondary data.

3.3 Nature and Sources of Data

Information is life blood of any research. Secondary information has been used in this study. The required data and information for analysis are directly collected from the annual reports of UNL and DNPL, direct contact to UNL and DNPL corporate office. Supplementary data and information are collected from

number of institution like Shanker Dev Campus Library, T.U. Central Library and Documentation Section of T.U. Library, NLL corporate office etc.

Secondary data have been collected from the following sources.
- Reports and Financial statement of the company.
- Published and Unpublished official rewords.
- Books, articles, magazine, annual report etc.

All the data are complied, processed and tabulated in the time series as per the need and objectives. Formal and informal talks to the concerned persons of the department of the bank were also helpful to obtain the additional information. Similarly, various data and information are collected from the economic journals, bulletins, magazines etc.

3.4 Data Gathering Procedure

The secondary data are directly obtained from various sources mentioned above for the purpose of data analysis is taken from official records, websites. The researcher had to visit the office of UNL and DNPL get data from the records.
And the primary data were collected through talk and discussion with the office personnel of UNL and DNPL. All gathered data have been used as per need and requirement of study.

3.5 Presentation and Analysis of Technique and Tools

To analyze the collected facts and figures, various accounting tools are used to effectiveness of inventory management and control wherever necessary. The inventory management techniques applied in this study is EOQ, different stock levels, inventory turnover ratio etc.

To achieve the objectives of the study, various financial as well as statistical tools have been used in this study. The analysis of data will be done according to pattern of data available. Because of Ltd. time and resources, some simple analytical statistical tools such as percentage change, coefficient of correlation and method of

least square are adopted in this study. Similarly, some strong accounting tools such as ratio analysis and trend analysis have also been for financial analysis. Such as:

- **Size of Inventory**

It measures the inventory size within the firm. Inventory size can be calculated and analyze with respective of Total Assets, Current Assets, Fixed Assets, Fixes Assets, Cost of Goods Sold, Sales etc.

Formula:

Percentage of Inventory on Cost of Goods Sold = $\frac{Inventory}{COGS} \times 100$

Percentage of Inventory on Total Sales = $\frac{Inventory}{Total\ Sales} \times 100$

Percentage of Inventory of Current Assets = $\frac{Inventory}{Current\ Assets} \times 100$

Percentage of Inventory of Total Assets = $\frac{Inventory}{Total\ Assets} \times 100$

Percentage of Inventory on Fixed Assets = $\frac{Inventory}{Fixed\ Assets} \times 100$

- **Structure of Inventory**

Inventory of UNL and DNPL can classified as Raw Materials, Packaging Materials, Work in Process, Finished Goods and Stores & Spares. Structure of Inventory refers the percentage of the composition of above mentioned five kinds of Inventories.

Formulas:

Percentage of Raw Materials in Inventory = $\frac{Raw\,Materials}{Inventories} \times 100$

Percentage of Packaging Materials in Inventory = $\frac{Packaging\ Materials}{Inventories} \times 100$

Percentage of Work in Process in Inventory = $\frac{WIP}{Inventories} \times 100$

Percentage of Finished Goods in Inventory = $\frac{Finished\ Goods}{Inventories} \times 100$

Percentage of Stores and Spares in Inventory = $\frac{Stores\ and Spares}{Inventories} \times 100$

- **Utilization of Inventory**

Inventory Turnover Ratio

It measures the velocity of conversion of stock into sales. A high stock turnover indicates efficiency management of Inventory because more frequently the stocks are sold; the less amount of capital is required to finance the inventory. A low turnover indicates over investment in stock, dull business, slow moving goods, and inefficient Inventory management. The ration is calculated as follows.

Inventory Turnover Ratio = $\frac{Cost\ of\ good\ sold}{Average\ inventory}$

Where,

Cost of good sold = opening stock + purchase- closing stock

Average Inventory= $\frac{Opening + Closing\ Stock}{2}$

Inventory Holding Days (DIH)

Inventory Holding Days represent how much day's Company holds the average Inventory. This can be calculated as follows:

$\therefore$ DIH= Average Inventory/ cost of goods sold $\times 360$

Or,

DIH= Closing Stock/ Sales $\times 360$

- **Ratio Measuring Activity**

Management is in trusted with the effectively and efficiently. As the resources are invested in various assets to generate sales and profit, the efficiency with which these assets are being turned over into sales are to be judged. For the attainment of this purpose, the following ratios are usually computed under this group.

Inventory assets turnover ratio

Inventory assets turnover ratio= $\frac{Sales}{Inventory}$

Current assets turnover ratio

$$\text{Current assets turnover ratio} = \frac{Sales}{CurrentAssets}$$

Profitability Ratios

An organization should earn profits to survive and grow over the long period of time but not at the cost of employees, customers and society. Obviously, organizations will have no future if it is unable to make reasonable profit from its operation. The profitability ratios are used as a measure to judge the operating efficiency (Success or failure) of an organization.

Gross Profit Margin:

This ratio measures the relationship between profit and sales and is computed as:

$$\text{Gross Profit Margin} = \frac{Gross\ \Pr ofit}{Sales} \ or \ \frac{Sales - Cost\ of\ goods\ sold}{Sales}$$

Economic Order Quantity (EOQ)

The Economic Order Quantity is that inventory level which minimizes the total ordering and carrying costs. It attempts to establish the most economic balance of the carrying cost and ordering cost. It determines the quantities to be ordered.

The basic objective of this technique is to determine the optimal order size to be placed on the basis of usage, ordering cost and carrying cost.

The mathematical formula for calculation of EOQ is:

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

Here,

A = Annual usage in units

O = Ordering cost

C = Carrying Cost

Graphical and analytical (or Trial and Error) approaches are also used in computation of EOQ.

The basic objective of this technique however is to determine the optimal size of order to be placed on the basis of usage, ordering cost and carrying cost.

Chapter 4
ANALYSIS AND INTERPRETATION

4.1. Inventory Size

Position of Inventory is major component for a manufacturing Firm. Inventory position can study with Total Assets, Current Assets, Fixed Assets, Sales Cost of Goods Sold.

4.1.1. Size of Inventory on Current Assets

Table No. 4.1 Size of Inventory on Cost of Goods Sold of UNL and DNPL

Rs. in Million

Fiscal year	Unilever Nepal Ltd.			Dabur Nepal Pvt. Ltd		
	Inventory	COGS	% of inventory on COGS	Inventory	COGS	% of inventory on COGS
2001/02	144.46	886.49	16.30	495.64	1966.071	25.21
2002/03	126.11	666.37	18.92	512.694	1932.089	26.54
2003/04	184.21	795.12	23.17	531.812	2173.128	24.47
2004/05	229.76	761.29	30.18	493.824	2327.809	21.21
2005/06	256.167	940.24	27.24	441.41	1489.724	29.63
Average	188.1414	809.902	23.16	495.076	1977.7642	25.41

Source: - Annual Reports of UNL and DNPL

Here, Percentage of Inventory on Cost of Goods Sold = $\frac{Inventory}{COGS} \times 100$

The table shows that the percentage of Inventory on Cost of Goods Sold of Unilever Nepal Ltd. in the year 2001/02 is 16.30 which is followed by 18.92, 23.17, 30.18 and 27.24 in the year 2002/03, 2003/04, and 2005/06 respectively and Average is 23.16. Similarly, the percentage of Inventory on Cost of Goods Sold of Dabur Nepal Private Ltd. are 25.21, 26.54, 24.47, 21.21 and 29.63 in the year 2001/02, 2002/03, 2003/04, 2004/05 and 2005/06 respectively whereas average is 25.41.

From this we concluded that the average percentage of Inventory on Cost of Goods Sold of Dabur Nepal Pvt. Ltd. is greater than that of Unilever Nepal Ltd.. i.e., 25.41 > 23.16.

The graphic presentation of level of Inventory on total current assets is as follows.

Fig 4.1

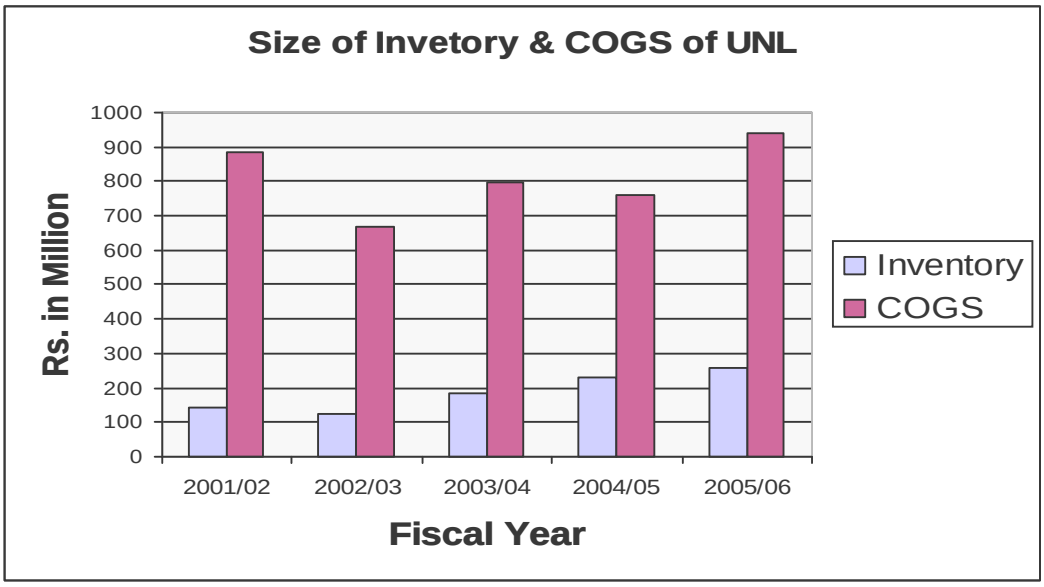
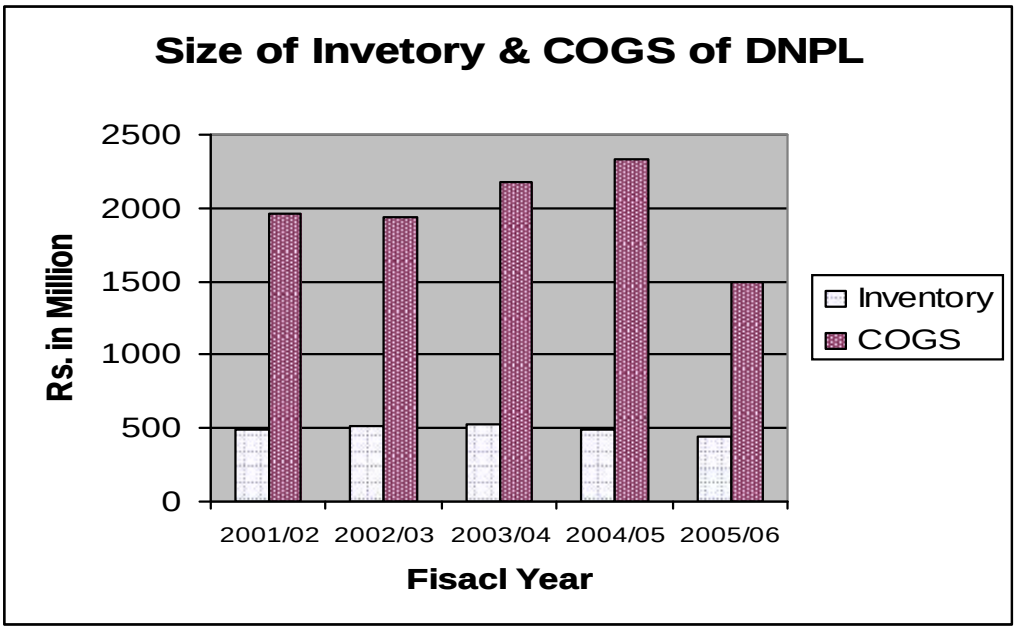


Fig 4.2



4.1.2. Size of Inventory on Total Sales of UNL and DNPL

Table No. 4.2 Size of Inventory on Total Sales of UNL and DNPL

Rs. in Million

Fiscal Year	Unilever Nepal Ltd.			Dabur Nepal Pvt. Ltd		
	Inventory	Total Sales	% of inventory on Total Sales	Inventory	Total Sales	% of inventory on Total Sales
2001/02	144.46	1236.45	11.68	495.64	2527.15	19.61
2002/03	126.11	1444.73	8.73	512.694	2716.72	18.87
2003/04	184.21	1524.9	12.08	531.812	2834.736	18.76
2004/05	229.76	1484.89	15.47	493.824	2963.441	16.66
2005/06	256.167	1469.68	17.43	441.41	1940.029	22.75
Average	188.1414	1432.13	13.08	495.076	2596.4152	19.33

Source: - Annual Reports of UNL and DNPL

Here, Percentage of Inventory on Total Sales = $\frac{Inventory}{Total\ Sales} \times 100$

The table shows that the percentage of Inventory on total sales of Unilever Nepal Ltd. in the year 2001/02 is 11.68 which is followed by 8.73, 12.08, 15.47 and 17.43 in the year 2002/03, 2003/04, and 2005/06 respectively and Average is 13.08. Similarly, the percentage of Inventory on total sales of Dabur Nepal Private Ltd. are 19.61, 18.87, 18.76, 16.66 and 22.75 in the year 2001/02, 2002/03, 2003/04, 2004/05 and 2005/06 respectively. Whereas average is 19.33.

From this we concluded that the average percentage of Inventory on total Sales of Dabur Nepal Pvt. Ltd. is greater than that of Unilever Nepal Ltd. i.e., 19.33>13.08.

The graphic presentation of level of Inventory on total current assets is as follows.

Fig 4.3

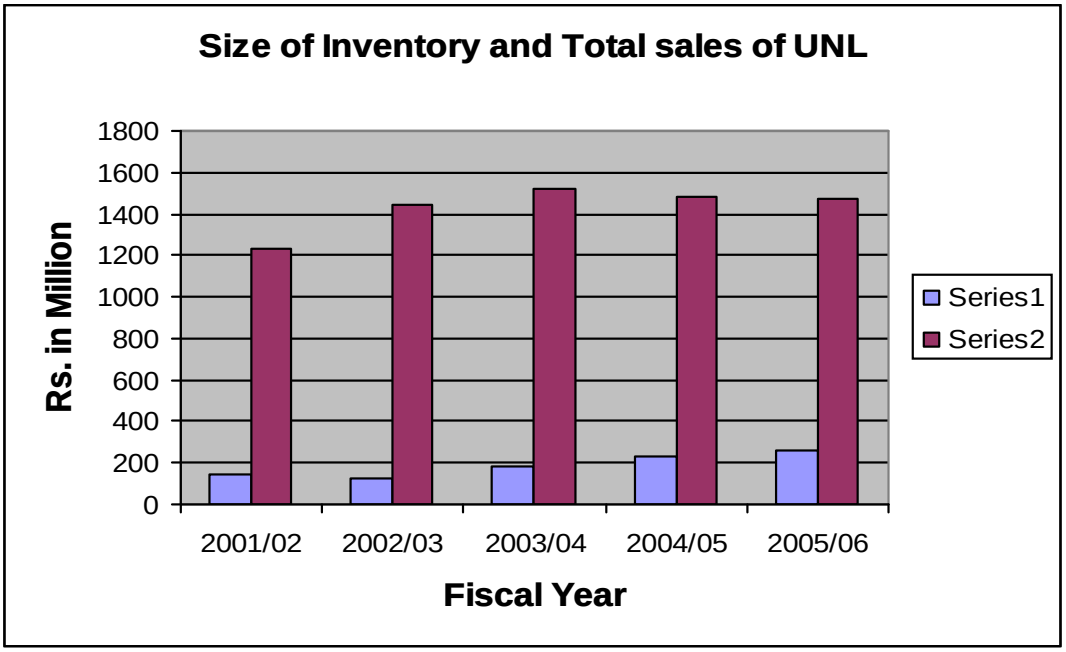
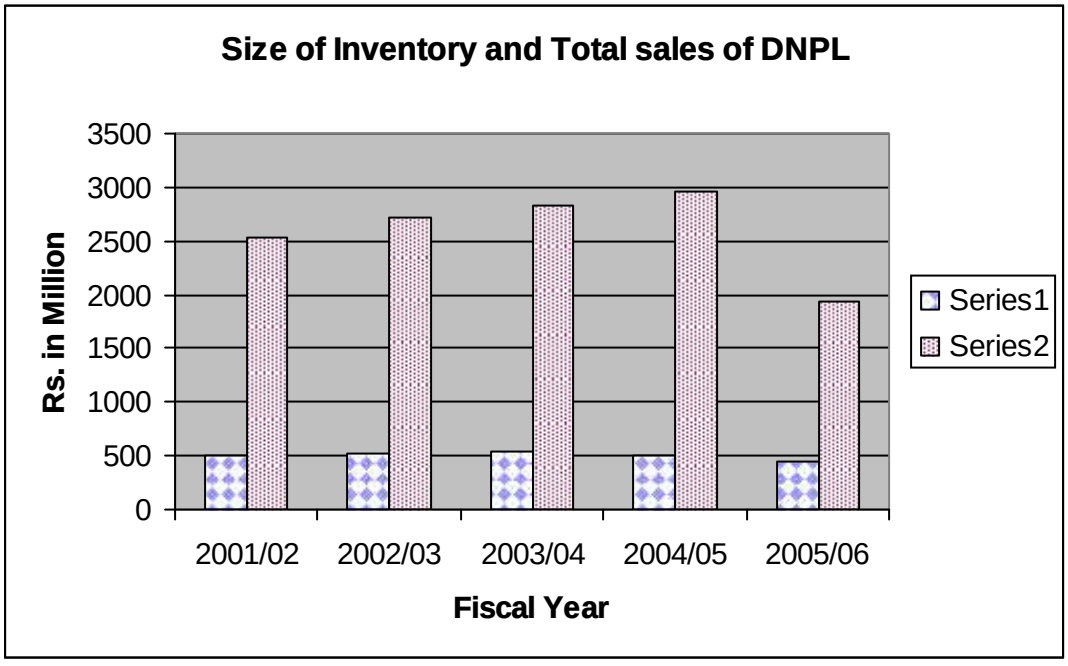

Size of Inventory and Total sales of UNL
Rs. in Million
1800
1600
1400
1200
1000
800
600
400
200
0
2001/02
2002/03
2003/04
2004/05
2005/06
Fiscal Year
Series1
Series2

Fig 4.4


Size of Inventory and Total sales of DNPL
Rs. in Million
3500
3000
2500
2000
1500
1000
500
0
2001/02
2002/03
2003/04
2004/05
2005/06
Fiscal Year
Series1
Series2

4.1.3. Size of Inventory on Current Assets.

Table No. 4.3. Size of Inventory on Current Assets of UNL and DNPL

Rs. in Million

Fiscal Year	**Unilever Nepal Ltd.**			**Dabur Nepal Pvt. Ltd.**		
	Inventory	Current Assets (CA)	% of Inventory on CA	Inventory	Current Assets	% of Inventory on CA
2002/02	144.46	399.14	36.19	495.64	1156.49	42.857
2002/03	126.11	589.88	21.38	512.694	1288.45	39.79
2003/04	184.21	724.24	25.43	531.812	1324.684	40.146
2004/05	229.76	891.41	25.77	493.824	883.985	49.75
2005/06	256.167	741.61	34.54	441.41	932.441	47.34
Average	188.1414	669.256	28.66	495.076	1172.8684	43.976

Source:- Annual Reports of UNL and DNPL

Here, Percentage of Inventory of Current Assets = $\frac{Inventory}{Current\ Assets} \times 100$

The table shows that the percentage of Inventory on total current assets of Unilever Nepal Ltd. in the year 2001/02 is 36.19 which is followed by 21.38, 25.43, 25.77 and 34.54 in the year 2002/03, 2003/04, and 2005/06 respectively and Average is 28.66. Similarly, the percentage of Inventory on total current assets of Dabur Nepal Private Ltd. are 42.857, 39.79, 40.146, 49.75, 47.34 in the year 2001/02, 2002/03, 2003/04, 2004/05 and 2005/06 respectively whereas average is 43.976.

From this we concluded that the average percentage of Inventory on total current assets of Dabur Nepal Pvt. Ltd. is greater than that of Unilever Nepal Ltd.. i.e., 43.976>28.664.

The graphic presentation of level of Inventory on total current assets is as follows.

Fig 4.5

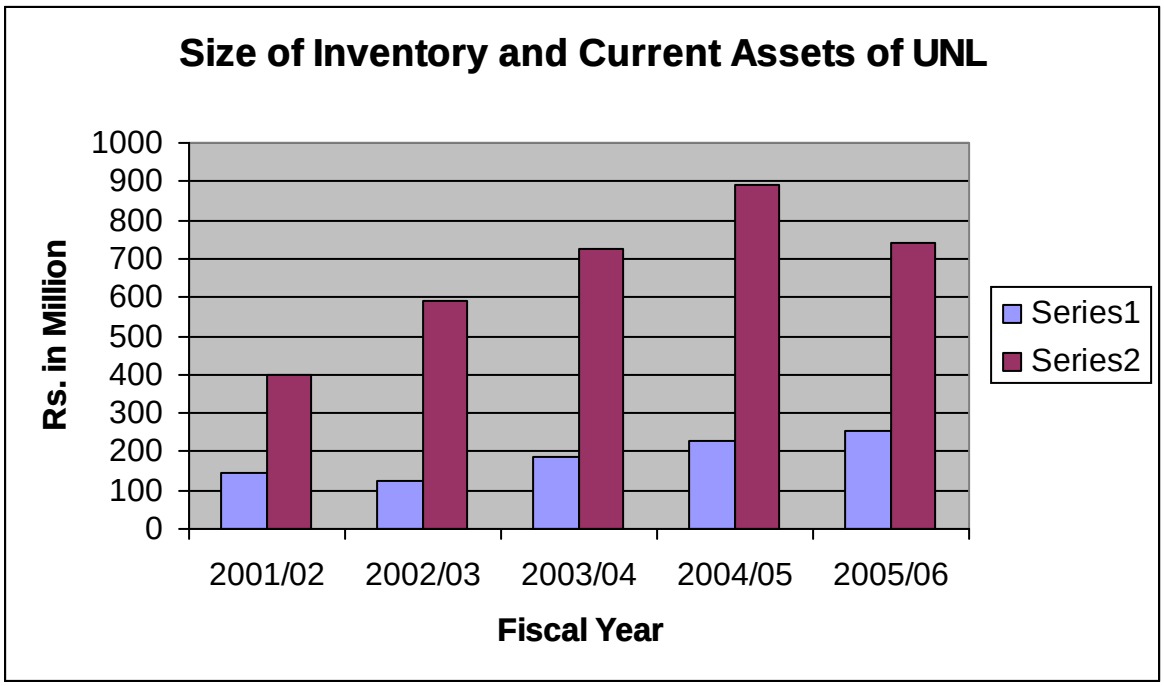
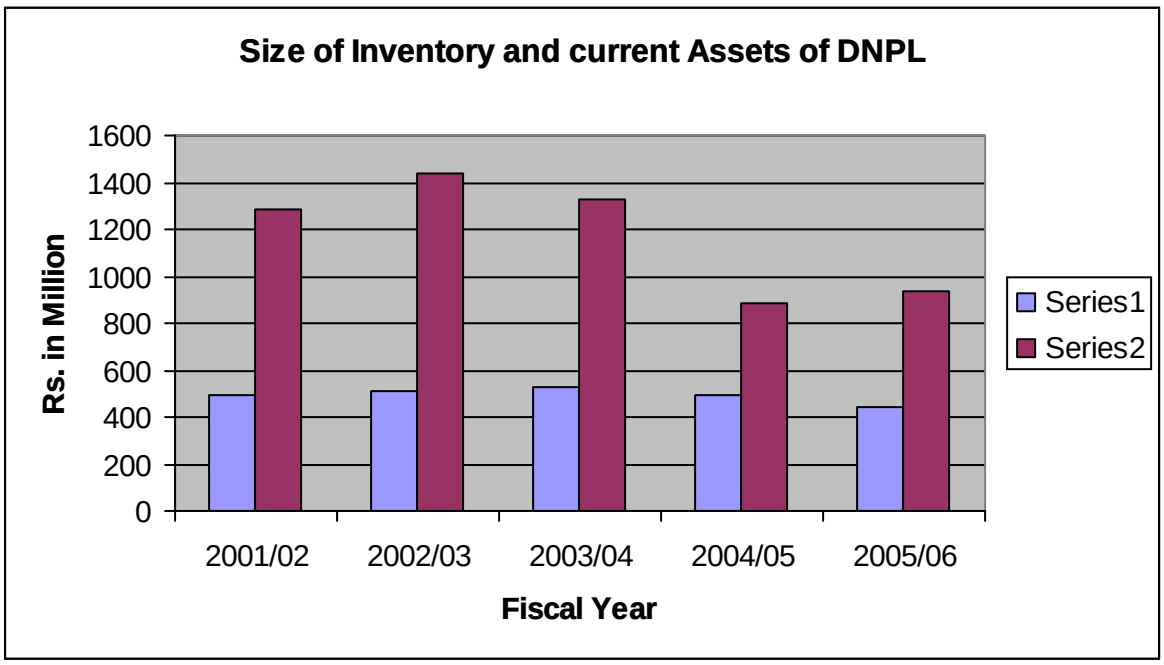


Fig 4.6



4.1.4. Size of Inventory on Total Assets

Table No. 4.4. Size of Inventory on Total Assets

Rs. in Million

Fiscal year	Unilever Nepal Ltd.			Dabur Nepal Pvt. Ltd		
	Inventory	Total Assets	% of inventory on TA	Inventory	Total Assets	% of inventory on TA
2001/02	144.46	969.53	14.90	495.64	2666.85	18.59
2002/03	126.11	1325.92	9.51	512.694	2718.64	18.86
2003/04	184.21	1620.19	11.37	531.812	2702.08	19.68
2004/05	229.76	1910.6	12.03	493.824	2333.23	21.16
2005/06	256.167	1969.43	13.01	441.41	1972.93	22.37
Average	188.1414	1559.134	12.16	495.076	2478.746	20.13

Source: - Annual Reports of UNL and DNPL

Here, Percentage of Inventory of Total Assets = $\frac{Inventory}{Total\ Assets} \times 100$

The table shows that the percentage of Inventory on Total Assets of Unilever Nepal Ltd. in the year 2001/02 is 14.90 which is followed by 9.51, 11.37, 12.03 and 13.01 in the year 2002/03, 2003/04, and 2005/06 respectively and Average is 12.16. Similarly, the percentage of Inventory on total assets of Dabur Nepal Private Ltd. are 18.59, 18.86, 19.68, 21.16 and 22.37 in the year 2001/02, 2002/03, 2003/04, 2004/05 and 2005/06 respectively, whereas average is 20.13.

From this we concluded that the average percentage of Inventory on total assets of Dabur Nepal Pvt. Ltd. is greater than that of Unilever Nepal Ltd.. i.e., 20.13>12.16.

The graphic presentation of level of Inventory on total current assets is as follows.

Fig 4.7

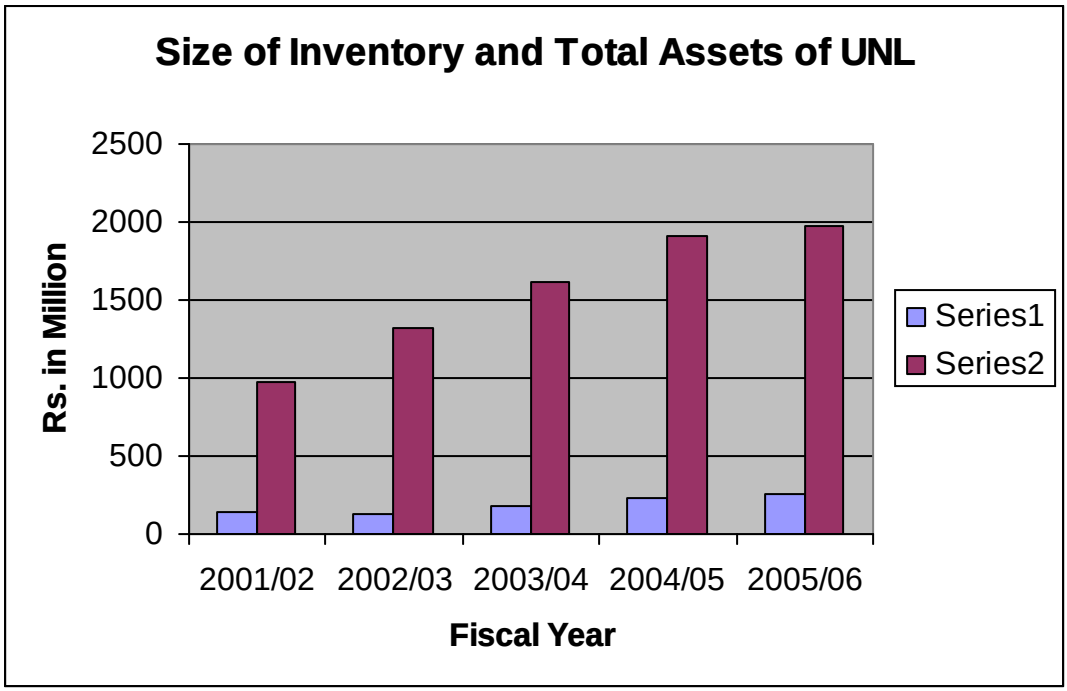
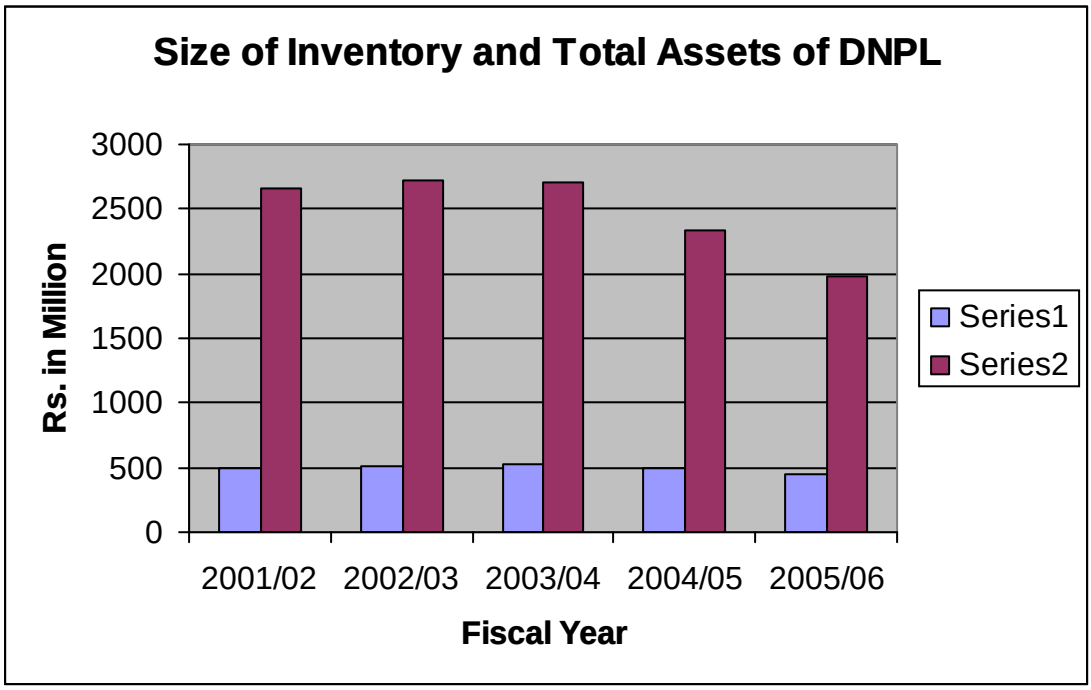


Fig 4.8



4.1.5. Size of Inventory on Fixed Assets

Table No. 4.5. Size of Inventory on Fixed Assets of UNL and DNPL

Rs. in Million

Fiscal year	Unilever Nepal Ltd.			Dabur Nepal Pvt. Ltd		
	Inventory	Fixed Assets	% of inventory on FA	Inventory	Fixed Assets	% of inventory on FA
2001/02	144.46	570.39	25.33	495.64	1377.78	35.97
2002/03	126.11	736.04	17.13	512.694	1284.27	39.92
2003/04	184.21	895.95	20.56	531.812	1377.4	38.61
2004/05	229.76	1019.19	22.54	493.824	1449.25	34.07
2005/06	256.167	1227.82	20.86	441.41	1040.49	42.42
Average	188.1414	889.878	21.29	495.076	1305.838	38.20

Source:- Annual Reports of UNL and DNPL

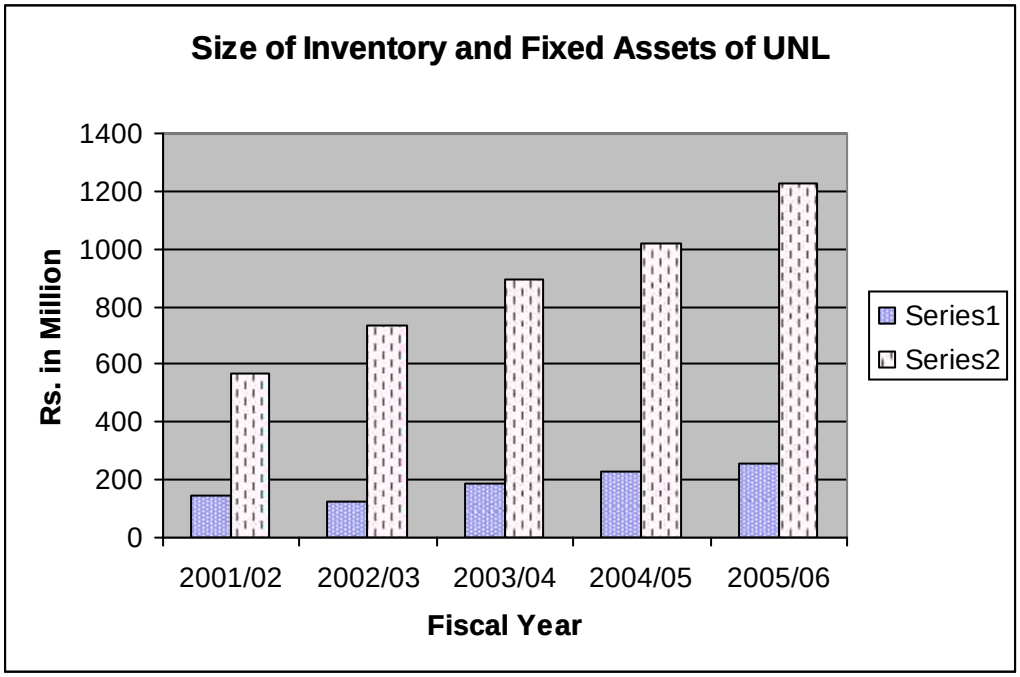
Here, Percentage of Inventory on Fixed Assets = $\frac{Inventory}{Fixed\ Assets} \times 100$

The table shows that the percentage of Inventory on Fixed Assets of Unilever Nepal Ltd. in the year 2001/02 is 25.33 which is followed by 17.13, 20.56, 22.54 and 20.86 in the year 2002/03, 2003/04, and 2005/06 respectively and Average is 21.29. Similarly, the percentage of Inventory on fixed assets of Dabur Nepal Private Ltd. are 35.97, 39.92, 38.61, 34.07 and 42.42 in the year 2001/02, 2002/03, 2003/04, 2004/05 and 2005/06 respectively whereas average is 38.20.

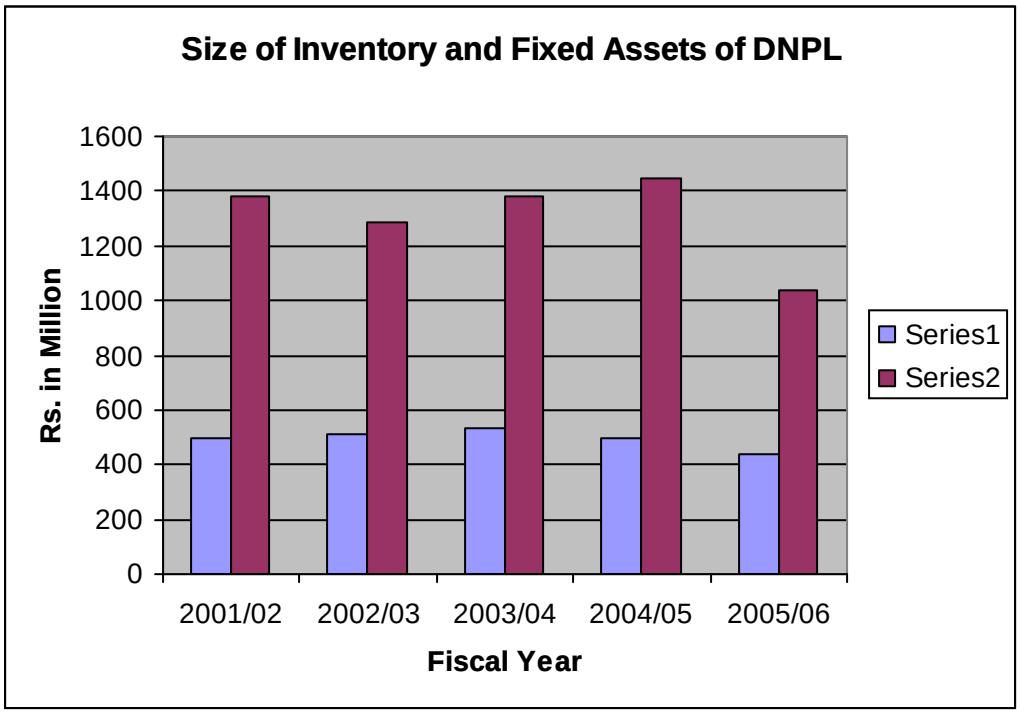
From this we concluded that the average percentage of Inventory on Total Fixed Assets of Dabur Nepal Pvt. Ltd. is greater than that of Unilever Nepal Ltd. i.e., 38.20>21.29.

The graphic presentation of level of Inventory on total current assets is as follows.

Fig 4.9



4.10



4.2. Structure of Inventory

4.2.1 Proportion of Raw Material on Total Inventory

Table No. 4.6. Proportion of Raw Materials on Total Inventory of UNL and DNPL

Rs. in Million

Fiscal Year	Unilever Nepal Ltd.			Dabur Nepal Pvt. Ltd.		
	Raw Materials (RM)	Inventory	% of RM in Inventory	Raw Materials	Inventory	% of RM in Inventory
2001/02	64.06	144.46	46.94	114.925	495.64	23.18
2002/03	59.20	126.11	51.72	120.576	512.694	23.52
2003/04	35.27	184.21	51.72	130.125	531.82	24.46
2004/05	62.36	229.76	27.14	147.822	439.824	33.61
2005/06	66.92	256.167	26.12	82.2542	484.276	16.98
Average	69.562	188.1414	40.728	119.14	492.85	24.35

Source:- Annual Report of UNL and DNPL

Note:-

Percentage of raw materials in Inventory = $\frac{Raw\,Materials}{Inventories} \times 100$

The above table shows that the raw materials consumed by the Unilever Nepal Ltd. are in fluctuating trend. In other words the percentage of raw materials in Inventories are 46.94, 51.72, 27.14 and 26.12 in the year 2001/02, 2002/03, 2003/04, 2004/05 and 2005/06 respectively and the average is 40.728%. Similarly, the percentage of raw materials in Inventory of the Dabur Nepal Pvt. Ltd are 23.18, 23.52, 24.46, 33.61, and 16.98 in the respective year 2001/02, 2002/03, 2003/04, 2004/05 and 2005/06 where as average is 24.35. Hence we concluded that the average percentage of raw materials in Inventory of the Dabur Nepal Pvt. Ltd is less than that of Unilever Nepal Ltd. i.e. 24.35<40.728.

The graphic presentation of level of Raw materials on Inventory in as follows

Fig No. 4.11

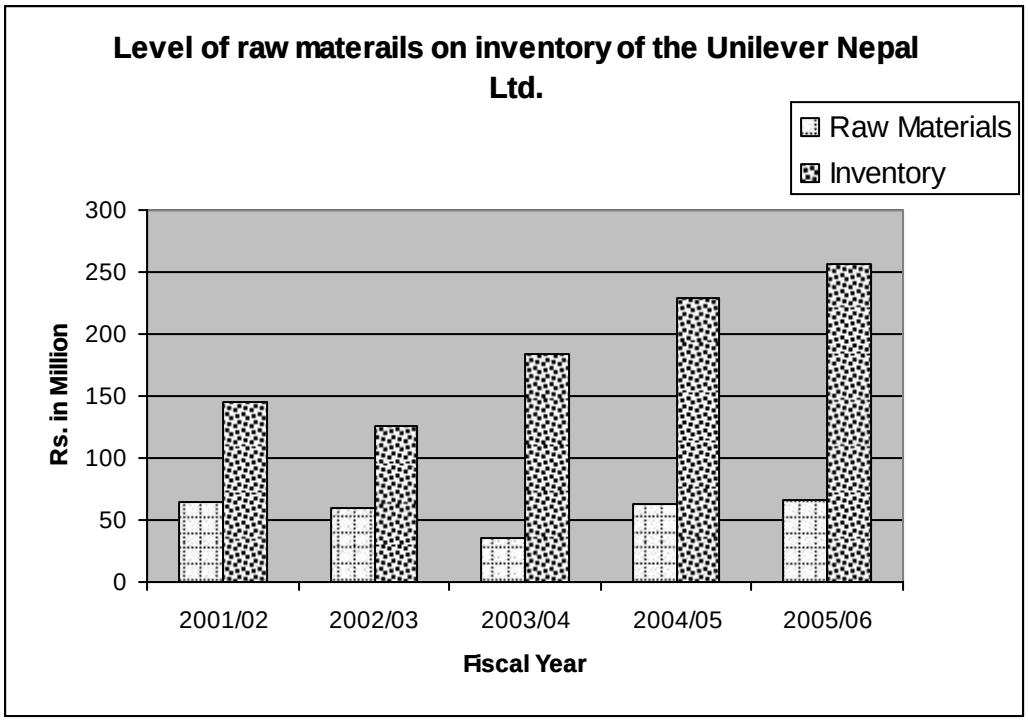
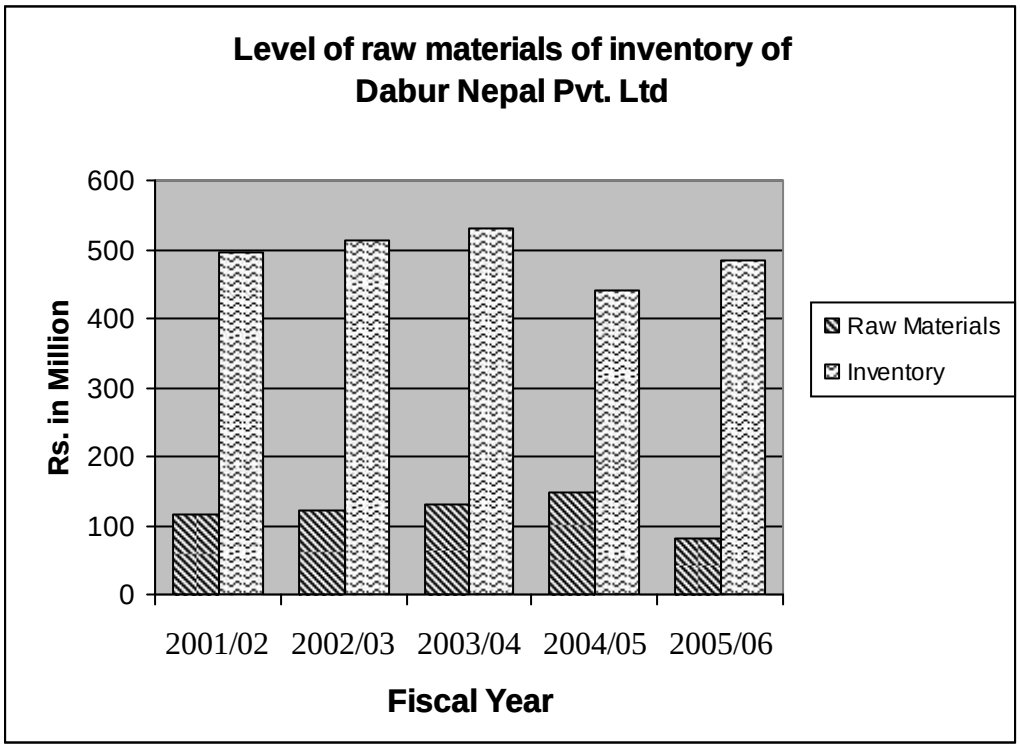


Fig 4.12



4.2.2 Proportion of Packing Materials on Inventory

Table No. 4.7.

Proportion of Packing Material on Total Inventory of Unilever Nepal Ltd and Dabur Nepal Pvt. Ltd

Rs in Million

Fiscal Year	Unilever Nepal Ltd.			Dabur Nepal Pvt. Ltd.		
	Packing materials (PM)	Inventory	%of PM on Inventory	Packing Materials	Inventory	% of PM on Inventory
2001/02	21.2	144.46	14.67	155.45	495.64	31.36
2002/03	11.5	126.11	9.11	165.35	512.694	32.25
2003/04	21.76	184.21	11.81	158.35	531.82	29.77
2004/05	13.76	229.76	5.98	145.285	439.824	33.03
2005/06	17.76	256.167	6.93	140.33	484.276	28.95
Average	17.196	188.1414	8.33	152.953	492.85	31.072

Sources: Annual Reports of UNL and DNPL

Note: - Percentage of Packing Materials on Inventory = $\frac{Packing\ Materials}{Inventory} \times 100$

This table shows that the percentage of packing materials on Inventories of the Unilever Nepal Ltd is fluctuating in nature i.e. 14.67, 9.11, 11.81, 5.98 and 6.93 in the respective year 2001/02, 2002/03, 2003/04, 2004/05 and 2005/06 where as average is 8.33. Similarly, the percentage of packing materials on Inventories of the Dabur Nepal Pvt. Ltd is 31.36, 32.25, 29.77, 33.03 and 28.95 in the respective year is 31.072. Hence we concluded that the average percentage of packing materials on Inventories of Unilever Nepal Ltd is less than that of Dabur Nepal Pvt. Ltd are 31.36, 32.25, 29.77, 33.03 and 28.95 in the respective year 2001/02, 2002/03, 2003/04, 2004/05 and 2005/06 and average is 31.072. Hence we concluded that the average percentage of packing materials on Inventories of Unilever Nepal Ltd. is less than that of Dabur Nepal Pvt. Ltd i.e. 8.33<31.072

The graphic presentation of level of packing materials of total Inventory is as follows.

Fig. No. 4.13

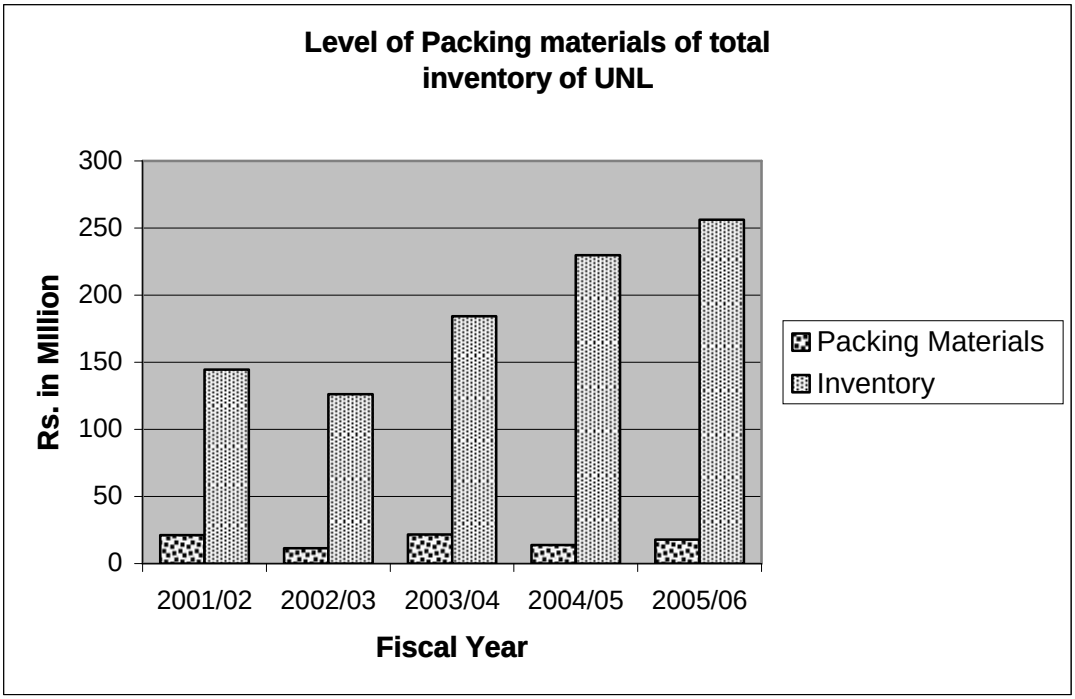
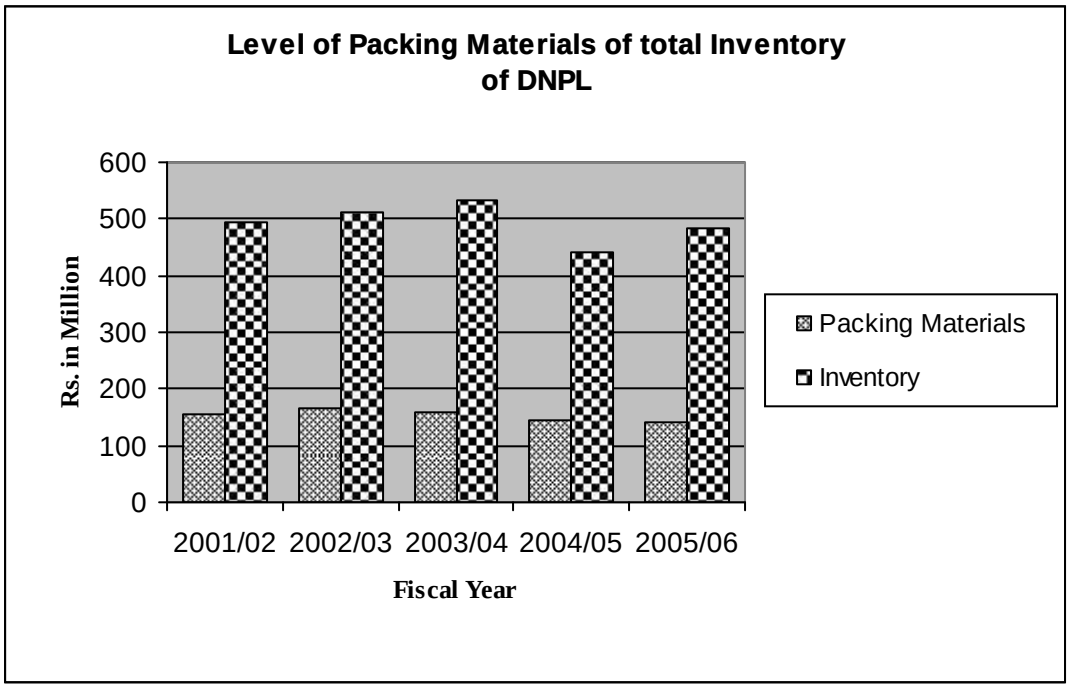


Fig. 4.14



4.2.3 Proportion of finished goods on Total Inventory

Table No. 4.8

Proportion of Finished Goods on Total Inventory of UNL and DNPL

Rs in Million

Fiscal Year	Unilever Nepal Ltd.			Dabur Nepal Private Ltd		
	Finished goods (FG)	Inventory	% of FG on Total Inventory	Finished goods	Inventory	%of FG on Total Inventory
2001/02	41.3	144.46	28.58	26.215	495.64	5.289
2002/03	44.5	126.11	35.28	29.977	512.694	5.84
2003/04	55.50	184.21	30.12	24.194	531.82	4.549
2004/05	93.78	229.76	40.82	51.965	439.824	11.814
2005/06	94.02	256.167	36.70	29.733	484.276	6.139
Average	65.82	188.1414	34.30	32.4168	492.85	6.7262

Sources: - Annual reports of UNL and DNPL

Note: - Percentage of finished goods on Total Inventories = $\frac{Finishedgoods}{Inventories} \times 100$

The table shows that the percentage of finished goods on total inventory of UNL in the year 2001/02 is 28.58% which is increase to 35.28% in the year 2002/03 and decrease to 30.12 in the year 2003/04 then it increase to 40.82% in the year 2004/05 then followed by 36.70% in the year 2005/06 and average is 34.30%.

Similarly, the percentage of finished goods on total inventory of Dabur Nepal Private Ltd. are 5.289, 5.84, 4.549, 11.814 and 6.139 in the year 2001/02, 2002/03, 2003/04, 2004/05 and 2005/06 respectively and average is 6.7262%.

The graphic presentation of level of finished goods on Total Inventory is as follows.

Fig No. 4.15

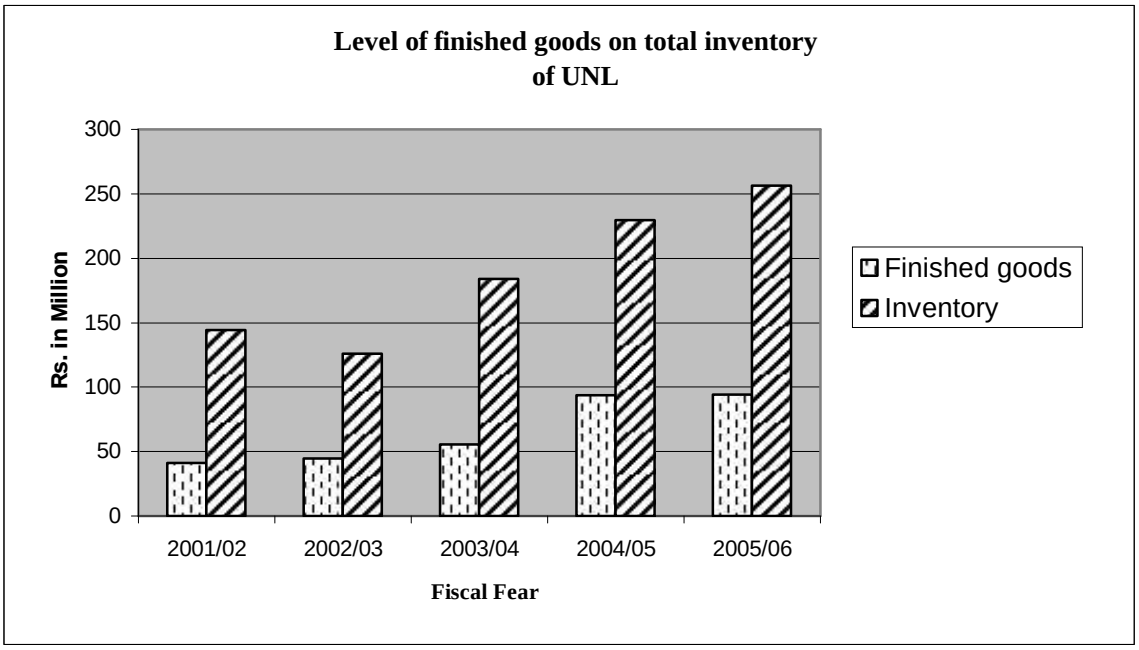
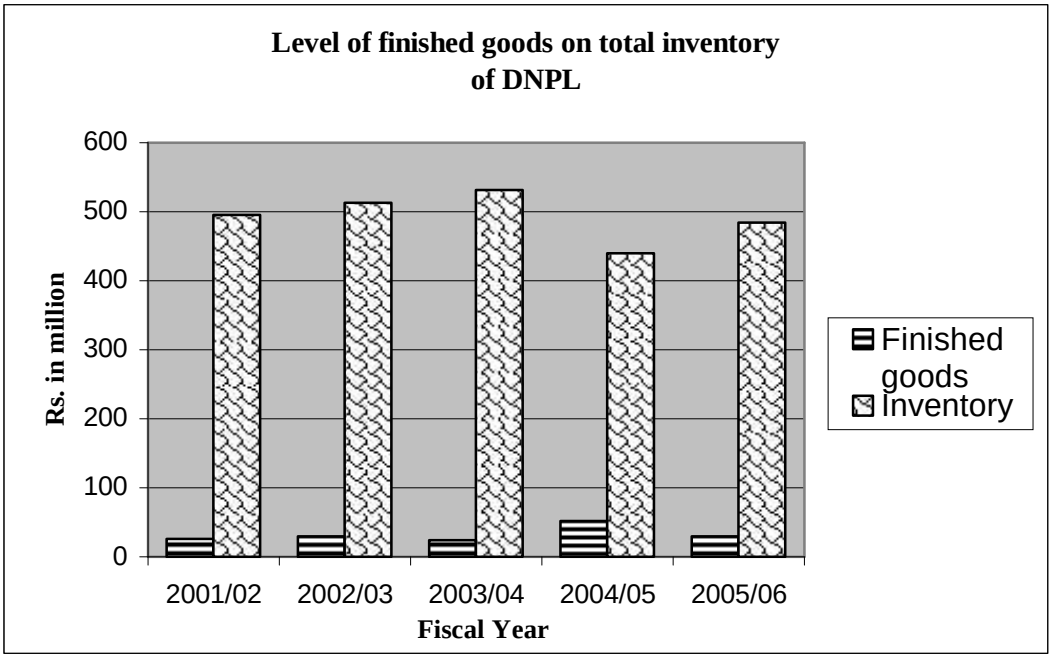


Fig No. 4.16



4.2.4. Proportion of WIP materials on Total Inventory

Table 4.9 Proportion of WIP materials on Total Inventory of UNL and DNPL

Rs. in Million

Fiscal Year	Unilever Nepal Ltd.			Dabur Nepal Pvt. Ltd		
	WIP	Total Inventory	% of WIP on Total Inventory	WIP	Total Inventory	% of WIP on Total Inventory
2001/02	6.3	144.46	4.36	12.753	495.64	2.573.
2002/03	4.02	126.11	3.18	9.681	512.694	1.882
2003/04	5.52	184.21	3	10.573	531.82	1.988
2004/05	3.50	229.76	1.52	10.10	439.824	2.296
2005/06	7.68	256.167	2.99	5.68	484.276	1.173
Average	5.404	188.1414	3.1	7.2068	492.85	1.468

Source: - Annual reports of UNL and DNPL

Note: - Percentage of WIP on Total Inventory = $\frac{WIP}{Inventoty} \times 100$

Table shows that the percentage of EIP on total Inventory of Unilever Nepal Ltd is 4.36, 3.18, 3, 1.52 and 2.99 in the respective year 2001/02, 2002/03, 2003/04, 2004/05 and 2005/06 respectively where as average is 3.01 percentage. Similarly, the percentage of WIP on total Inventory of Dabur Nepal Private Ltd. are 2.573, 1.882, 2.296 and 1.173 in the year 2001/02, 2002/03, 2003/04, 2004/05 and 2005/06 respectively where as average is 1.468.

The graphic presentation of level of WIP on Total Inventory is as follows

Fig No. 4.17

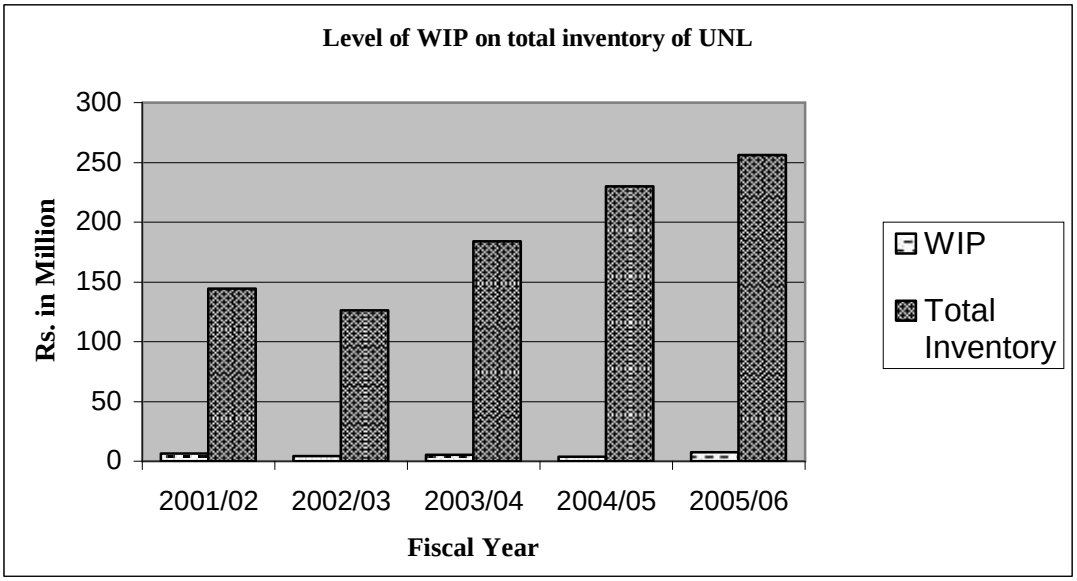
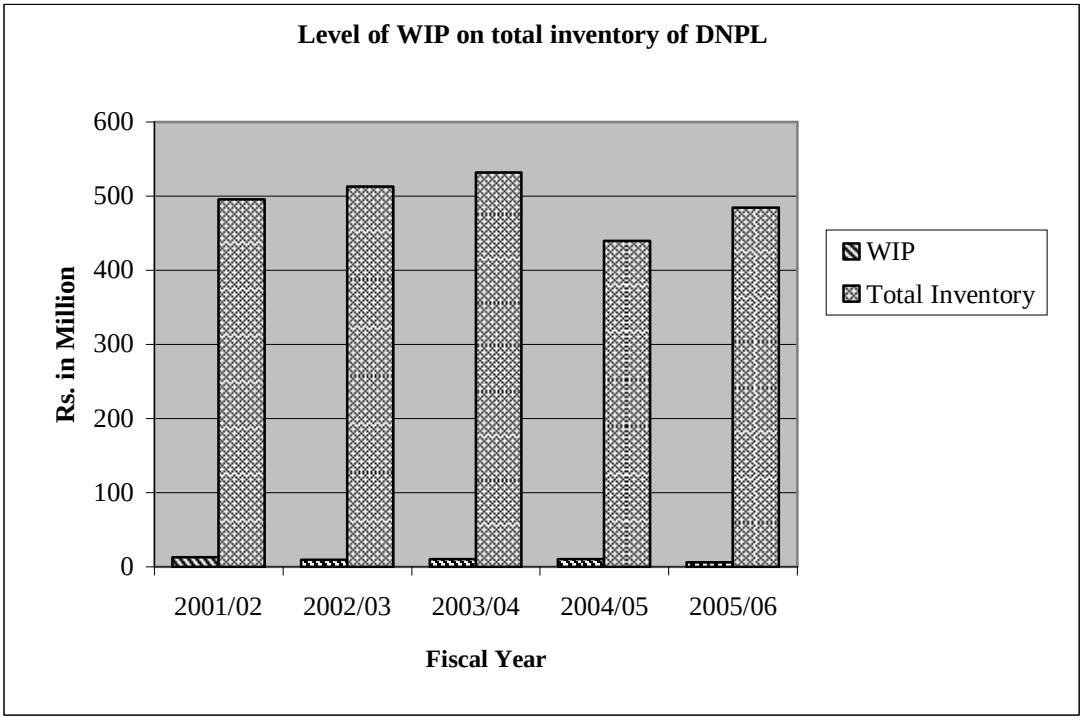


Fig No. 4.18



4.2.5. Proportion of Stores and spares on total Inventory

Table No. 4.10

Proportion of Stores and Spares Parts on Total Inventory of UNL and DNPL

Rs. in Million

Fiscal Year	Unilever Nepal Ltd.			Dabur Nepal Private Ltd.		
	Store & Spare	Total Inventory	% of Store & Spare on total Inv.	Store & Spare	Total Inventory	% of Store & Spare parts on total Inv.
2001/02	11.5	144.46	7.96	35.46	495.64	7.15
2002/03	6.9	126.11	5.47	32.65	512.694	6.37
2003/04	6.15	184.21	3.34	30.95	531.82	5.82
2004/05	4.52	229.76	1.96	26.042	439.824	5.92
2005/06	6.98	256.167	2.72	21.33	484.276	4.40
Average	7.21	188.1414	4.29	29.2864	492.85	5.932

Sources: - Annual reports of UNL and DNPL

Notes: - Percentage of Store and Spares on Total Inventory = $\frac{Stores\ and\ Spares}{Total\ Inventory} \times 100$

The table shows that the percentage of stores and spares on total inventory of UNL are 7.96, 5.47, 3.34, 1.96 and 2.72 in the year 2001/02, 2002/03, 2003/04, 2004/05 and 2005/6 respectively and average is 4.29 percentage. Similarly the percentage of stores and spares on total Inventory of DNPL are 7.15, 6.37, 5.82, 5.92 and 4.40 in the year 2001/02, 2002/03, 2003/04, 2004/05, and 2005/06 respectively where as average is 5.932%.

The graphic presentation of level of stores and spares on total inventory

Fig no. 4.19

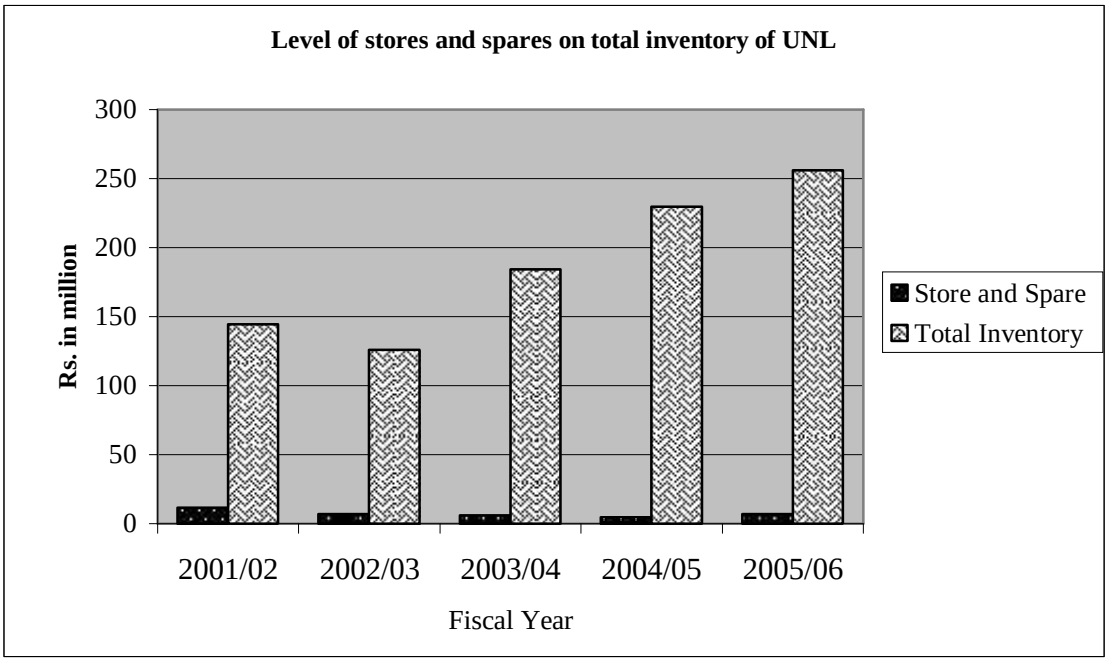
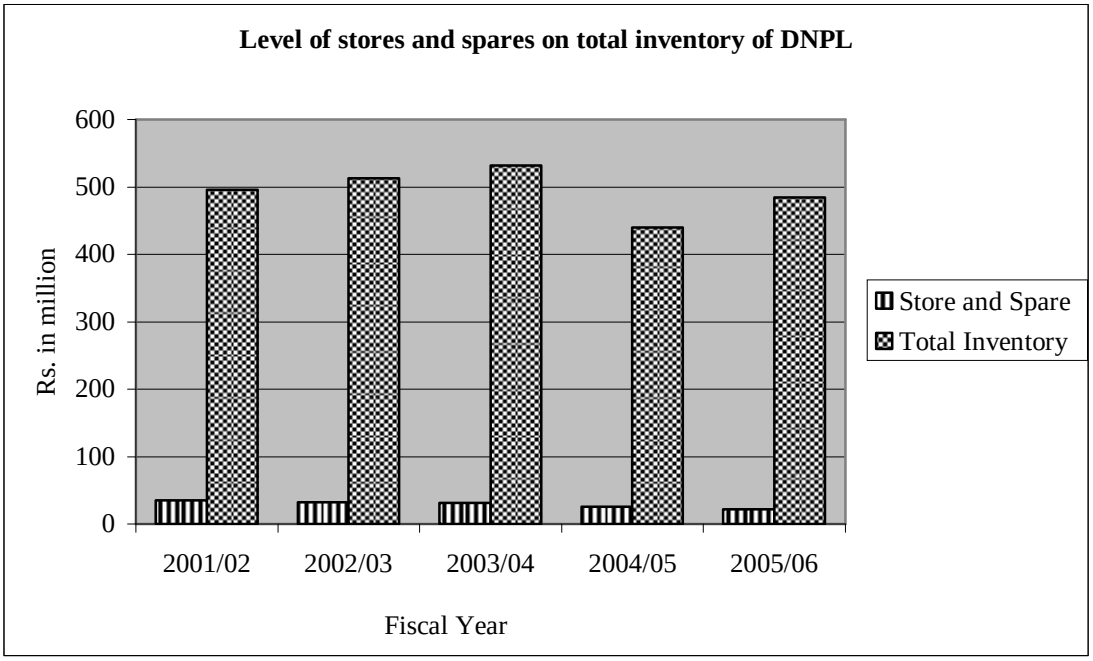


Fig No. 4.20



4.2.6. Structure of Average Inventory

Table No. 4.11. Structure of Average Inventory of UNL and DNPL

Inventory	% of Average Inventory	
	UNL	**DNPL**
Raw Materials	40.73	24.35
Packing Materials	8.33	31.07
Finished Goods	34.30	6.73
Work in Process	3.10	1.47
Stores and Spares	4.29	5.93
Others	9.25	30.45
Total	100	100

Sources: - Annual reports of UNL and DNPL

Table No. 4.11 shows the structure of Average Inventory of UNL and DNPL. This is the average % of five kind of inventories; Raw Materials, Packing Materials, Finished Goods, Work in process Materials, stores & spares and others in average of five fiscal Years; 2001/02, 2002/03, 2003/04, 2004/05 and 2005/06.

The percentage of Average Inventory of UNL of Raw Materials, Packing Materials, Finished Goods, Work in process Materials and stores and spares are 40.728, 8.33, 34.30, 3.1 and 4.29 respectively which shows that Unilever Nepal Ltd. have highest investment in Raw Materials(40.728%) and Lowest Investment in Work in Process (3.1%).

The percentage of Average Inventory of DNPL of Raw Materials, Packing Materials, Finished Goods, work in process Materials and stores and spares are 24.35, 31.072, 6.7262, 1.468 and 5.932 respectively. It shows that Dabur Nepal Private Ltd. have highest investment on Packing Materials (31.072%) and Lowest in Work in Process (1.468%).

It can Displayed in Pie – Chart as Follows:

.**Fig. No. 4.21.** Structure of Average Inventory of UNL

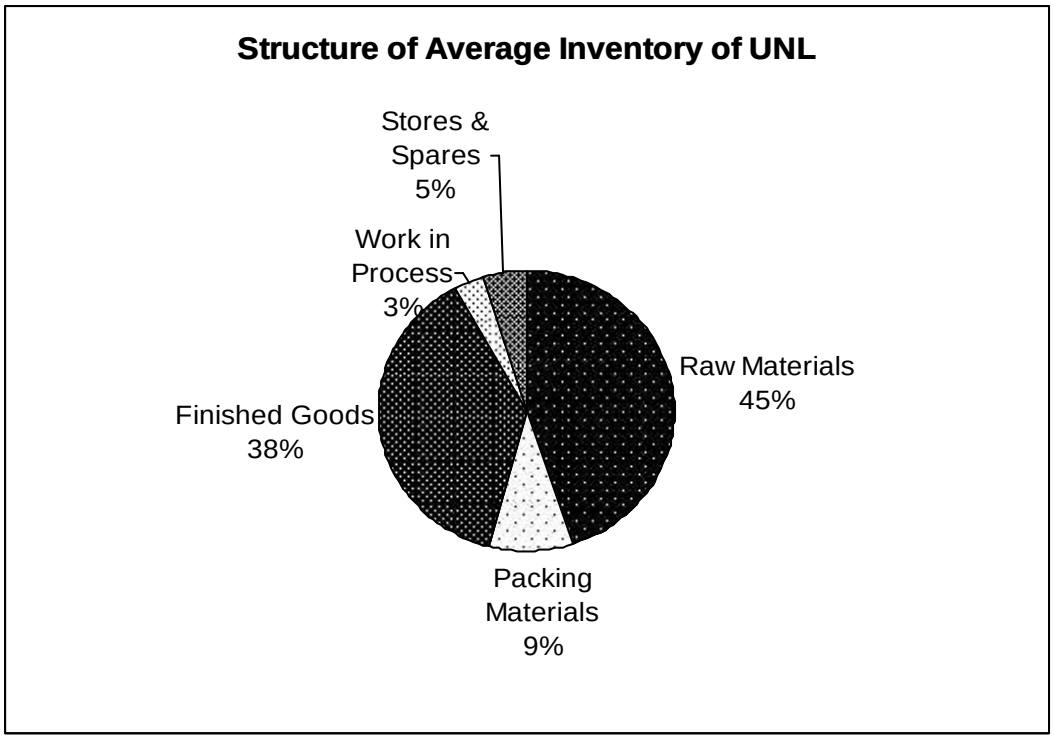
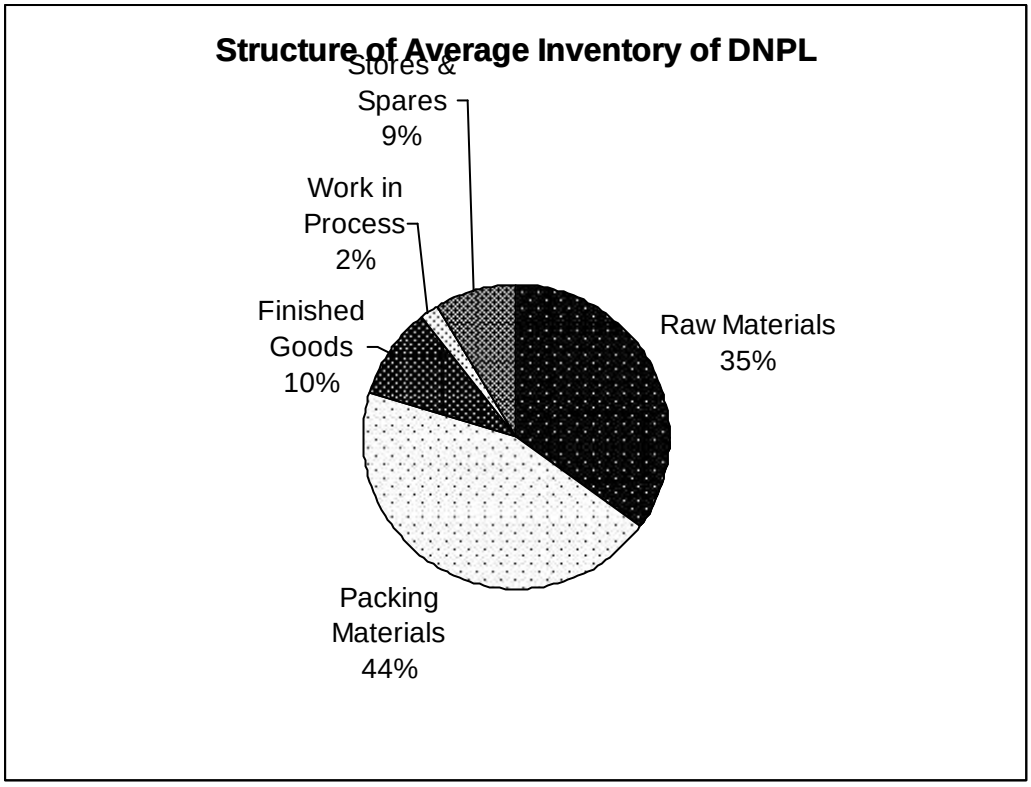


Fig No. 4.22. Structure of Average Inventory of DNPL



4.3. Utilization of Inventory

4.3.1. Ratio Analysis

An analysis of the form's ratio is generally the first step in the financial analysis. The ratios are designed to show relationship between financial statement accounts. Financial analysis is an evaluation of both of form's past 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 tow quantity figures. The ratio analysis is the financial tools by which the financial strength and weakness are measured by relating two accounting data.

4.3.1.1. Inventory Turnover Ratio:-

It measures the velocity of conversion of stock into sales. A high stock turnover indicates efficiency management of Inventory because more frequently the stocks are sold; the less amount of capital is required to finance the inventory. A low turnover indicates over investment in stock, dull business, slow moving goods, and inefficient Inventory management. The ration is calculated as follows.

Inventory Turnover Ratio = $\frac{Cost\ of\ good\ sold}{Average\ inventory}$

Where,

Cost of good sold = opening stock + purchase- closing stock

Average Inventory = $\frac{Opening + Closing\ Stock}{2}$

Table No. 4.12

Inventory Turnover ratios of Unilever Nepal Ltd. and Dabur Nepal Private Ltd.

Rs. in Million/Ratio

Fiscal Year	Unilever Nepal Ltd.			Dabur Nepal Private Ltd.		
	Cost of good sold	Average inventory	Turn over ratio	Cost of good sold	Average inventory	Turn over ratio
2001/02	886.49	70.52	12.56	1966.071	467.288	4.2
2002/03	666.37	61.44	10.81	1932.089	484.725	3.99
2003/04	795.12	77.24	10.29	2173.128	374.15	5.81
2004/05	761.29	109.29	6.92	2327.809	536.69	4.33
2005/06	940.236	95.09	9.88	1489.424	354.82	4.2
Average	809.90	82.726	9.80	1977.7042	443.5346	4.45

Source: Annual reports of ULN and DNPL

The table shows that the inventory turnover ratio of Unilever Nepal Ltd. is fluctuating in nature. The ratio 12.56 is highest in the FY 2001/02 and 6.92 are lowest in the year 2004/05. And the average ratio is 9.80. Similarly the ratios of DNPL is also in fluctuating trend i.e. 5.81 is highest turnover ratio in the FY 2003/04 and 3.99 is lowest in the year 2002/03 where as average ratio is 4.45. Hence we concluded that the Unilever Nepal Ltd. Nepal is more efficient than the Dabur Nepal Private Ltd. to manage the assets.

4.3.2. Inventory Holding Days (DIH)

Inventory Holding Days represent how much day's Company holds the average Inventory. This can be calculated as follows:

$\therefore$ DIH= Average Inventory/ cost of goods sold $\times$360

Or

DIH= Closing Stock/ Sales $\times$360

Table no. 4.13

Inventory Holding Days of UNL and DNPL

Rs. in Million

Fiscal Year	Unilever Nepal Ltd.			Dabur Nepal Pvt. Ltd.		
	Cost of goods sold	Average Inventory	Inventory Holding Days	Cost of goods sold	Average Inventory	Inventory Holding Days
2001/02	886.49	70.57	28.65	1966.071	467.288	85.56
2002/03	666.37	61.44	33.19	1932.089	484.725	90.32
2003/04	795.12	77.24	34.97	2173.128	374.15	61.98
2004/05	761.29	109.29	51.68	2327.809	536.69	83
2005/06	940.236	95.09	36.41	1489.424	354.82	85.76
Average	809.90	82.726	36.98	1977.7042	443.5346	81.42

Inventory holding days represents how many days the company holds the average inventory in ware house. Low DIH represents efficient inventory management whereas high DIH represent inefficient inventory management.

The above table shows that the least inventory holding days 28.65 of the Unilever Nepal Ltd. in the FY 2001/02 where as highest 51.68 days in the year 2004/05 and average DIH is 36.98 days. Similarly, the 61.32 days is highest in the year 2002/03. Since the low DIH represents the efficient inventory management. So, we can conclude that Unilever Nepal Ltd. is more efficient inventory management than that of Dabur Nepal Private Ltd. due to low average inventory holding days.

4.3.3. Ratios Measuring Activity

Management is in trusted with the effectively and efficiently. As the resources are invested in various assets to generate sales and profit, the efficiency with which these assets are being turned over into sales are to be judged. For the attainment of this purpose, the following ratios are usually computed under this group.

4.3.3.1. Inventory turnover ratio

I. Inventory turnover ratio= $\frac{Sales}{Inventory}$

Table No. 4.14

Inventory Turnover Ratio

Rs. in Million

Fiscal Year	Unilever Nepal Ltd.			Dabur Nepal Private Ltd.		
	Sales	Inventory	Ratio	Sales	Inventory	Ratio
2001/02	1236.45	144.46	8.56	2527.15	495.64	5.1
2002/03	1244.73	126.11	9.87	2716.72	512.694	5.3
2003/04	1524.90	184.21	8.28	2834.735	531.82	5.3
2004/05	1484.89	229.76	6.46	2963.441	439.824	6.74
2005/06	1469.68	256.167	5.74	1940.029	484.276	4.0
Average	-	-	7.74	-	-	5.288

This table shows that the inventory assets turnover ratio of UNL in the year 2001/02 is 8.56 which is followed by 9.87, 8.28, 6.46 and 5.74 in the year 2002/03, 2004/05, always 2005/06 respectively and average is 7.782. Similarly, the inventory assets turn over ratio of DNPL are 5.1, 5.3, 5.3, 6.74 and 4 in the year 2001/02, 2002/03, 2003/04, 2004/05 and 2005/06 respectively and average is 5.288.

From this we concluded that the average inventory assets turnover ratio of Unilever Nepal Ltd. is greater than of Dabur Nepal Pvt. Ltd. i.e. 7.782>5.288.

4.3.3.2. Current Assets turnover ratio

Current Assets turnover ratio = $\frac{Sales}{Total\ current\ assets}$

Table No: 4.15

Current Assets turnover ratio

Rs in Million

Fiscal Year	Unilever Nepal Ltd.			Dabur Nepal Pvt. Ltd.		
	Sales	TCA	Ratio	Sales	TCA	Ratio
2001/02	1236.45	399.14	3.1	2527.15	1289.065	1.96
2002/03	1444.73	589.88	2.45	2716.72	1434.166	1.89
2003/04	1524.90	724.24	2.10	2834.735	1324.684	2.89
2004/05	1484.89	891.41	1.66	2963.441	883.986	3.35
2005/06	1469.68	741.61	1.98	1940.029	932.441	2.1
Average	-	-	2.258	-	-	2.438

The table shows that the current assets turnover ratio of UNL in the year 2001/02 is 1.1 which is followed by 2.45, 2.10, 1.66 and 1.98 in the year 2002/03, 2003/04, 2004/05, and 2005/06 respectively and average is 2.258. Similarly, the current assets turnover ratio of DNPL are 1.96, 1.89, 2.89, 3.35 and 2.1 in the year 2001/02, 2002/03, 2003/04, 2004/05 and 2005/06 respectively where as average in 2.438.

From the above, we concluded that the average current assets turnover ratio of Dabur Nepal Private Ltd. is greater than that of Unilever Nepal I.E 2.438>2.258.

4.3.4. Profitability Ratios

An organization should earn profits to survive and grow over the long period of time but not at the cost of employees, customers and society. Obviously, organizations will have no future if it is unable to make reasonable profit from its operation. The profitability ratios are used as a measure to judge the operating efficiency (Success or failure) of an organization.

4.3.4.1. Gross Profit Margin:

This ratio measures the relationship between profit and sales and is computed as:

$$\text{Gross Profit Margin} = \frac{Gross\ \text{Pr}ofit}{Sales} \ or \ \frac{Sales - Cost\ of\ goods\ sold}{Sales}$$

Table No. 4.16

Gross profit margin

Fiscal Year	Unilever Nepal Ltd.				Dabur Nepal Pvt. Ltd.			
	Sales	COGS	Gross profit	Ratio %	Sales	COGS	Gross profit	Ratio %
2001/02	1236.45	886.49	349.96	28.30	2527.15	1966.671	566.479	22.2
2002/03	1444.73	666.37	778.36	53.87	2716.72	1932.089	784.631	34.62
2003/04	1524.90	795.12	729.78	47.86	2834.735	2173.128	661.667	23.34
2004/05	1484.89	761.29	723.60	48.73	2963.441	2327.809	635.632	21.45
2005/06	1469.68	940.236	529.444	36	1940.029	1489.424	450.605	23.23
Average	-	-	-	42.952	-	-	-	24.968

The table shows that the gross profit margin of Unilever Nepal Ltd. in the year 2001/02 is 28.03which is followed by 53.87, 47.86, 48.73 and 36 in the year 20021/03, 2003/04, 2004/05 and 2005/06 respectively and average is 42.952. Similarly, Gross Profit Margin of Dabur Nepal Private Ltd. are 22.2, 34.62, 23.34, 21.45 and 23.23 in the year 2001/02, 2002/03, 2003/04, 2004/05 and 2005/06 respectively and average is 24.968.

From this we can concluded that the Unilever Nepal Ltd.'s operating efficiency is more that then of Dabur Nepal Private Ltd. or operating efficiency of Dabur Nepal Private Ltd. is poor than that of Unilever Nepal Ltd..

4.4. Inventory Management and Control Techniques:

4.4.1. Economic order quantity (EOQ)

Optimum level of raw material has been determined by the application of EOQ model.

Note: - Calculation of carrying cost is based on go down rent, insurance and electricity.

Calculation of ordering cost is based on total consumption of raw materials.

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

Carrying cost = Average Inventory × Carrying Cost per tones

Ordering cost = No. of orders × ordering cost per order

Total cost = Total ordering cost + Total carrying cost

4.4.1.1. Economic order Quantity of R.M of UNL of FY 2001/02

a. Formula Approach of EOQ. On the basis of company's record

The following data are available.

Annual Requirement (A) = 17362 Tons.

Ordering cost per order (O) = Rs. 108472

Carrying Cost per ton (C) = Rs. 1123

EOQ =?

By applying EOQ formula:

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

$$= \sqrt{\frac{2 \times 17362 \times 108472}{1123}}$$

$$= 1831 \text{Tons}$$

$$\text{No. of Order} = \frac{A}{EOQ}$$

$$= \frac{17362}{1831}$$

$$= 9.48 \times$$

From the above calculation the EOQ is 1831 tons, which minimizes the total ordering and carrying cost. No. of order is 9 times per year. So, it is clear that, if the company wants to minimize total cost of Inventory of R.M it should order 9 times during year.

4.4.1.2. Economic order quantity of R.M of Dabur Nepal Pvt Ltd. on FY 2001/02

a) By formula approach of EOQ:-

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

Annual Requirement (A) = 55345 tons

Ordering cost per order (O) = Rs 125475

Carrying cost per orde3r (C) = Rs 1342

EOQ =?

We have,

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 55345 \times 125475}{1342}}$$
$$= 3217\, tons$$

$$No.of\ orders = \frac{A}{EOQ}$$
$$= \frac{55345}{3217}$$
$$= 17\, times$$

From the above calculation on the EOQ is 3217 tons which minimizes the total ordering and carrying cost.

The above table show that the carrying cost is decreasing and ordering cost is increasing with the increasing no. of orders. From this the minimum total cost of R.M is 4317851 where the total carrying and ordering cost are Rs 82184776 and 2133075 respectively with no. of orders 17 times per year. Hence, we concluded that the Economic order quantity of DNPL is 17 times per year of R.M.

4.4.1.3. Calculation of Economic Order Quantity of R.M of the Unilever Nepal Ltd for the year 2002/03

a. By formula method

On the basis of company following data are available.

Annual requirement (A) = 16166 ton

Ordering cost per order (O) = 109432

Carrying cost per ton (C) = 1167

EOQ =?

Now,

We have,

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 16166 \times 109432}{1167}}$$
$$= 1741 \ tons$$

$$No.of\ orders = \frac{A}{EOQ}$$
$$= \frac{16166}{1741}$$
$$= 9 \ times$$

From the above calculation the EOQ is 1741 tons and no. of orders is 9 times year. So, we concluded that if the company wants to minimize the total cost of inventory of R.M, it should order 9 times during the Fiscal Year 2002/03.

4.4.1.4. Calculation of Economic order quantity of R.M of Dabur Nepal Private Ltd. for the year 2002/03.

By formula method

On the basis of company record following data are available.

Annual Requirement (A) = 57845 tons

Ordering cost per order (O) = Rs 127425

Carrying cost per orde3r (C) = Rs 1432

EOQ =?

We have,

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 57845 \times 127425}{1432}}$$
$$= 3208 \ tons$$

$$No.of\ orders = \frac{A}{EOQ}$$
$$= \frac{57845}{3208}$$
$$= 18 \ times$$

From the above calculation the EOQ is 18 times and no. of orders are 18 times per year, which trade off between ordering cost and carrying cost.

4.4.1.5. Economic Order Quantity of R.M for FY 2003/04 of UNL & DNPL

Calculation of EOQ by formula method for the Unilever Ltd. Nepal Ltd.

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

Annual Requirement (A) = 21090 tons

Ordering cost per order (O) = Rs 112245

Carrying cost per orde3r (C) = Rs 1430

EOQ =?

We have,

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 21090 \times 112245}{1430}}$$
$$= 1820 tons$$

$$No. of\ orders = \frac{A}{EOQ}$$
$$= \frac{21090}{1820}$$
$$= 12\ times$$

From the above calculation the EOQ is 1820 tons under the formula method which minimizes the total ordering and carrying cost with no. of orders is 12 times.

4.4.1.6. Economic Order Quantity of R.M on FY 2003/04 of Dabur Nepal Pvt. Ltd.

a. Calculation of EOQ by formula method

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

Annual Requirement (A) = 58085 tons

Ordering cost per order (O) = Rs 127672

Carrying cost per orde3r (C) = Rs 1447

EOQ =?

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 58085 \times 127672}{1447}}$$
$$= 3202 \ tons$$

We have, $$No.of\ orders = \frac{A}{EOQ}$$
$$= \frac{58085}{3202}$$
$$= 18 \ times$$

From the above calculation the EOQ is 3202 tons. Under formula method, which minimizes the total ordering and carrying cost with no. of orders is 18 times.

4.4.1.7. Economic order quantity of R.M. on FY 2004/05 of Unilever Nepal Ltd.

a. Calculation of EOQ by formula method

Annual Requirement (A) = 19484 tons

Ordering cost per order (O) = Rs 103700

Carrying cost per orde3r (C) = Rs 995

EOQ =?

We have,

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 19484 \times 103700}{995}}$$
$$= 2015 \ tons$$

$$No.of\ orders = \frac{A}{EOQ}$$
$$= \frac{19484}{2015}$$
$$= 10 \ times$$

From the above calculation the EOQ is 2015 tons under the formula method which minimizes the total ordering and carrying cost with number of orders 10 times

4.4.1.8. Economic order quantity of R.M as on FY 2004/05 of Dabur Nepal Private Ltd..

a. Calculation of EOQ by formula method

Annual Requirement (A) = 54844 tons

Ordering cost per order (O) = Rs 124767

Carrying cost per orde3r (C) = Rs 1423

EOQ =?

We have,

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 54844 \times 124767}{1423}}$$
$$= 3101 \; tons$$

$$No.of\ orders = \frac{A}{EOQ}$$
$$= \frac{54844}{3101}$$
$$= 17.68 \; times$$
$$\cong 18 (approx) times$$

From the above calculation of EOQ is 3101 tons under the formula method which minimizes the total ordering and carrying cost with the no. of orders 18 times.

4.4.1.9. Economic Order Quantity of R.M as on FY 2005/06 of Unilever Nepal Ltd.

a. Calculation of EOQ by formula method

Annual Requirement (A) = 21082 tons

Ordering cost per order (O) = Rs 112725

Carrying cost per orde3r (C) = Rs 1235

EOQ =?

We have,

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 112725 \times 21082}{1235}}$$
$$= 1975 \; tons$$

$$No.of\ orders = \frac{A}{EOQ}$$
$$= \frac{21082}{1957}$$
$$= 10.77 \; times$$
$$\cong 11 (approx) times$$

From the above calculation, the EOQ is 1957 tons under the formula method which minimizes the total ordering and carrying cost with the no. of orders 11 times.

4.4.1.10. Economic Order Quantity of R.M as on FY 2005/06 of Dabur Nepal Private Ltd.

a. Calculation of EOQ by formula method

Annual Requirement (A) = 55160 tons

Ordering cost per order (O) = Rs 1123512

Carrying cost per orde3r (C) = Rs 1487

EOQ =?

We have,

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 55160 \times 1123512}{1487}}$$
$$= 3027 \ tons$$

$$No.of\ orders = \frac{A}{EOQ}$$
$$= \frac{55160}{3027}$$
$$= 18 \ times$$

From the above calculation, the EOQ is 3027 tons under the formula method which minimizes the total ordering and carrying cost with the no. of orders 18 orders during the fiscal year 2005/06.

4.4.2. Percentage change in EOQ

Percentage change in EOQ indicates the actual position of EOQ during different time period. It also describes fluctuation of EOQ during certain period. The researcher has tried to calculate the percentage changes in EOQ for the study period.

4.4.2.1. Percentage change in EOQ of UNL

Table No. 4.27. Calculation of percentage change in EOQ of UNL

Fiscal Year	EOQ (tons)	Percentage Change in EOQ
2001/02	1675	-
2002/03	1831	9.31
2003/04	1820	0.68
2004/05	2015	10.71
2005/06	1957	2.88

Note:-

$$\text{Percentage Change in EOQ} = \frac{EOQ\ of\ Current\ Year - EOQ\ of\ \text{Pr}evious\ Year}{EOQ\ of\ \text{Pr}evious\ Year}$$

The figures in bracket are negative.

The table shows that the, percentage change in EOQ in fluctuating during the study period. In the FY 2002/03 it is 9.31% which is decrease to 0.68% in the year 2003/04 and increase to 10.71% in the year 2004/05 which is decrease negative by 2.88% in the year 2005/06.

4.4.2.2. Percentage change in EOQ of DNPL

Table No. 4.28 Calculation of Percentage change in EOQ of DNPL

Fiscal Year	EOQ (tons)	% Change in EOQ
2001/02	3217	-
2002/03	3208	2.8
2003/04	3202	1.87
2004/05	3101	3.15
2005/06	3027	2.38

$$\text{Note:-Percentage Change in EOQ} = \frac{EOQ\ of\ Current\ Year - EOQ\ of\ \text{Pr}evious\ Year}{EOQ\ of\ \text{Pr}evious\ Year}$$

The figures in bracket are negative.

The table shows that the percentage change in EOQ of DNPL which is negatively fluctuated i.e. (2.8), (1.87), (3.15), and 2.28 are in the year 2002/03, 2003/04, 20054/05 and 2005/06 respectively.

CHAPTER FIVE

Summary, Conclusion and Recommendation

5.1 Summary

Inventory management is one of the most important functions in any organization. Without effective and efficient inventory management, an organization can not achieve its goal. Success of any enterprises basically depends on the efficiency and effectiveness of current assets management. Inventory management is the most important part of the current assets management. The manufacturing company has to invest most of amount for inventory, when the functions are associated as purchasing, storing, selling and distribution etc.

Inventory management is the important part for the manufacturing company. A firm cannot achieve its goal unless inventories are controlled effectively and capital is allocated efficiently. Inventory functions are associated with production, marketing, finance and administration etc. Inventory constitutes most significant part of current assets. It should therefore be managed efficiently to avoid unnecessary investment.

The basic problem of this study is to examine the inventory management system practiced by the companies are unfavorable. The carrying cost, ordering cost, order size and safety stock maintained is unsatisfactory and unscientific. It is not paying much attention. Therefore, all these functions lead to increase total cost of the company.

The main objective of this study is to identify the inventory management system of Unilever Nepal Ltd. and Dabur Nepal Pvt. Ltd. In this study, one attempt has been made to identify the inventory position of UNL and DNPL, to know the relationship between sales and inventories with identifying their trends, to assess the inventories and their consequences on profitability of UNL and DNPL and suggest over practice of Inventory management of UNL and DNPL.

The required information is secondary which are collected from the annual reports of UNL and DNPL. All the collected data are analyzed on the basis of inventory management with the help of EOQ model. Inventory turnover ratio, raw materials turnover ratio, average percentage of the total study period by presenting with table and figure in required places. The analysis has been done year wise as well as the average of total study period. To make certain type of inventory management

decision many statistical and financial tools and techniques are available for controlling the inventory but the companies have not applied some sort of technique for managing the inventory.

5.2 Conclusions

The inventory management of manufacturing company is not only necessary, but also compulsion for better performance of the organization. If UNL and DNPL initiates step to the appropriate management of inventory, certainly it will cope its objective successfully. This study is just a small part to fulfillment the partial requirement of MBS degree. Concerning these findings it may be appropriate to make some suggestion and recommendations. Although these suggestions may not be enough, they certainly suggest the areas that can be improvement in inventory of UNL and DNPL.

To sum up all analysis the inventory management of manufacturing company is not only necessary, but also compulsion for better performance of the organization. The inventory management system of both Unilever Nepal Ltd. and Dabur Nepal Private Ltd. is not sufficient. The major tools and techniques of inventory management such as ABC analysis, Economic Order Quantity (EOQ) are not being applied. The inventory position and turnover position are not properly mentioned. Turnover ratios of both companies are fluctuating year to year. Both companies have not applied scientific cost classification techniques such as least square method, high low method etc. Therefore, unnecessary costs are incurred on ordering and carrying cost of the inventory.

The values maintaining proper stock of inputs as well as discussed previously are necessary and compulsory to know the answer about when to buy and how much to buy. The model examples, formulas and graphs as discussed previously are necessary for every manufacturing and non manufacturing enterprise to reduce idle cost incurred on ordering and carrying cost.

Through these models, examples and formulas the companies can manage inventory properly. But they could not be used fully for finding out the necessary operation of the company due to lack of adequate data. No techniques for inventory management are possible to apply for calculating one of the major decision when to buy because of lack of planning and systematic method of recording and maintaining of proper data

on stock out cost, over stock cost, carrying cost, ordering cost, price of raw materials etc separately. If Unilever Nepal Ltd. and Dabur Nepal Pvt. Ltd. initiate steps to appropriate management of inventory, certainly, they will achieve their objectives successfully.

Both companies Unilever Nepal Ltd. and Dabur Nepal private Ltd. are faced some problems on managing proper inventories in using pull system because there is uncertainty about the future supply of materials operation of factory. Trefoils strikes geographical problem fluctuation of material prices.

5.3 Recommendations

To achieve the overall objectives of the organization, the efficient management of inventory is essential. If both companies Unilever Nepal Ltd. and Dabur Nepal private Ltd. adopt the scientific techniques of inventory management certainly it would cope its objectives very successfully.

On the basis of the study the following suggestion may recommended for consideration.

1. Both the companies should clearly define its objectives with regarding to its inputs and out puts separately. Quantities and time period should be specified about purchase of raw materials.
2. However, if possible maximum stock level, minimum stock level and reorder level as well as economic lot size should be calculated by both organizations. This helps the management to trade off between liquidity and profitability in the organization.
3. In comparison to UNL, DNPL's inventory continues the highest proportion among the current assets. So DNPL should pay great attention to the inventory management. The company should adjust the inventory according to the sales and production and its priority.
4. Both companies should follow all the scientific tools and techniques like EOQ, ABC analysis two bin cards. JIT with the help of scientific tools and techniques company can solve the over stock, under stock, as well as out of stock problem. In order to minimize inventory cost 'A' item should be

controlled carefully and should be paid more attention than 'B' can 'C' items. 'B' lies in between 'A' and 'C' items. If requires neither careful nor simple but a moderate control system is adequate for this item.

5. Planning of Inventory is most welcomes in the world today. So products of different types of personal products, or oral care, different groups of soaps detergents should be produced on planned basis and attention should given to implementing better marketing strategies to take a strategic advantage of competitive world.
6. Inventory should not treat as a reason for investment rather it should be planed as coordinating factor between sales and production.
7. Both companies faced by the problem in production planning and unsuitable inventory and production policy, look of coordination between sales and production so the companies should clarify production and inventory policy.
8. To avoid the problem of overstocking. Both the companies should consider the following points.
   - Forecast sales should be realistic.
   - Forecast should be with in the capacity of being fulfilled.
   - Demand should be forecasted with appropriate techniques.

9. For timely procurement and supply of raw materials both companies should not depend upon unreliable sources. It is better to procure raw materials by calling tender who is more reliable and economic.

At last it is recommended to both organizations to enhance the material control mechanism because studies by experts in this field have bought out it if an organization can affect 5% saving in materials cost, it would be as increasing the production or sales by about 36%. So, both organizations take initiative steps in the current cost of materials management that reduces cost of production of and effects on selling price per units.

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