CHAPTER- 3

INVENTORY MANAGEMENT
AND CONTROL
3.1 INTRODUCTION:

Inventories constitute the most significant part of current assets of a large majority of companies in India. On an average, inventories are approximately 60% of current assets in public limited companies in India. Because of the large size of inventories maintained by firms, a considerable amount of funds 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.¹

In a manufacturing unit usually about 20 to 30% of the total assets are in the form of inventory and any effort in stock control will bring major benefit for the enterprise.²

The literary meaning of the word inventory is stock of goods. To the finance manager inventory connotes the value of raw materials, consumables, spares, work in progress, finished goods and scrap in which a company’s funds have been invested. He considered inventory as locked up capital. On the opposite side are the user departments, which clamour for more. To satisfy both side, the inventory is to be controlled the financial manager exercises control over inventory. Gopalan and Sandhilya are of the opinion that uncontrolled inventory can become an organizations cancer. Inventories means tangible property held:

(i) For sale in the ordinary course of business
(ii) In the process of production for such sale
(iii) For consumption in the production of goods or services for sale, including maintenance, supplies and consumables other than machinery spares.

Managing working capital is synonymous with controlling inventories. Good inventory management is good finance mgt. Even actively and gainfully worked out strategies in the formulation of inventory policies are designed to speed up turnover and maximum
returns investment. An efficient management of inventory should ultimately result in the maximization of the owners wealth the financial manager is actually a kind of a watch-dog over other functional areas. Broadly speaking, the inventory management problem is one of maintaining for a given financial investment, an adequate supply of something in order to meet an accepted distribution or pattern of demand. Inventory control is a science based art of ensuring that enough inventory or stock is held by an organization to meet both its internal and external demand commitments economically there can be a disadvantage in holding either too much or too little inventory therefore, inventory control is primarily concerned with obtaining a correct balance between these two extremes. In fact, it is often said of inventory control that the available theory leads the current practice to be put up to an education the very existence of inventory creates costs. Inventory management may be defined as the sum total of those activities which are necessary for the acquisition, storage, sale and disposal or use of material. An inventory is a list or schedule of articles comprised in an estate, describing each article separately and precisely so as to show what the estate consists of it is well recognized asset gradually assuming importance as asset management.  

3.2 TYPES OF INVENTORY:

An efficient management of inventory is an essential requirement for the success of the enterprise the inventory of a manufacturing concern is classified into the following types:

- **Raw Material**- It includes direct material used in the manufacture of a product and it also includes the components, fuels etc. used in the manufacture.
- **Work-in-Progress**- It includes partly finished goods and materials, sub-assemblies etc. held between manufacturing stages stock of the in progress are in the process of production.
• **Finished goods**—The goods ready for sale or distribution will come under this category.

The classification of inventory of a paretic firm depends upon the nature of business it carries. For a spinning mill cotton is the raw material and yarn is the finished product. A manufacturing concern inventory consist of all the above three type of inventory but in case of a trading concern the first two categories will not appear in their stocks.

The production manager and finance manager of a manufacturing company should know the items of inventory, classification of inventory, and costs related to each item of inventory before taking way step for efficient management of inventory. The efficiency shown in inventory will have direct impact on profitability of a business enterprise.

For efficient management of inventory the following techniques are used:-

**Economic order Quantity**—(EOQ) the economic order quantity (EOQ) is an optimum quantity of materials to be ordered after consideration of the following three categories of costs.

**Ordering costs**—The costs of ordering inventory include the following—

- Preparation of purchase order.
- Costs of receiving goods.
- Documentation processing costs.
- Transport costs.
- Intermittent costs of chasing orders, rejecting faulty goods.
- Additional costs of frequent or small quantity orders.
- Where goods are manufactured internally, the set up and tooling costs associated with each production run.

**Carrying costs**—The carrying costs of inventory include the following—

- Storage costs (rent, lighting, heating, refrigerate air conditioning etc)
- Stores staffing, equipment maintenance and running costs.
• Handling costs.
• Audit stock taking or perpetual inventory costs.
• Required rate of return on investment in current assets.
• Obsolescence and deterioration costs.
• Insurance and security costs.
• Costs of money tied up in inventory.
• Pilferage and damage costs.

Stock out costs- The stock out costs is associated with running out of stock which includes the following.
• Lost contribution through the lost sales caused by the stock out.
• Loss of future sales because customers go elsewhere.
• Loss of customer goodwill.
• Cost of production stoppage caused by stock outs of wip or raw material.
• Labour frustration over stoppages.
• Extra costs associated with urgent, often small quantity, replenishment purchases.

DECISION AREAS:
There are four major decision areas in inventory management-
(i) Classification problem
(ii) Order quantity problem
(iii) Order point problem and
(iv) Safety Stock.

CLASSIFICATION PROBLEM
The first step in the inventory planning control process is the classification of different types of inventory to determine the type and degree of control required for each. The ABC system is a widely used classification technique for the purpose on the basis of the cost involved the various items are classified into three categories- (i) A, Consisting of items with the largest investment, (ii) C, with relatively small investments, but fairly large no. of items, and (iii) B, which stands mid way between category control, C requires minimum attention, and B deserves less attention that A but more than C.
ORDER QUANTITY PROBLEM:

The second key inventory problem relates to determination of the size/quantity of inventory which would be required this is the order quantity problem, the economic order quantity or economic lot size (EOQ) is that level of inventory order which minimize the total cost associated with inventory mgt. Stated with reference to cost perspective, EOQ refers to the level of inventory at which the total cost of inventory comprising.

(i) Order/set up cost and (ii) Carrying costs is the minimum, symbolically \[ EOQ = \sqrt{\frac{2AB}{C}} \]

Where A= Annual usage of inventory in units
B= Buying costs per order.
C= Carrying cost per unit.

ORDER POINT PROBLEM

Yet another important question relating to inventory planning and control is: When should the order to procure inventory be placed? It is what is called the order point problem the re-order point is that level of inventory when a fresh order should be placed with suppliers to procure additional inventory equal to the EOQ. It is that inventory level which is equal to the consumption during the lead time or procurement time.

Re-order level=(daily usage X lead time) + Safety stock

SAFETY STOCKS:

These are the minimum additional inventory which serve as a safety margin to meet an unanticipated increase in usage this increase may due to an unusually high demand or because of uncontrollable late receipt of incoming inventory. The following steps are involved in determining the level of safety stocks:
(i) The first step is to estimate the probability of being out of stock, as well as the size of stock-out in terms of the shortage of inventory at different levels of safety stock.

(ii) After the determination of size and probability of stock out, the next step is the calculation of the stock-out cost. The stock out cost can be found out by multiplying the stock out by the costs per unit, and the probability of stock out.

(iii) Then, the carrying costs should be calculated, the carrying costs are equal to the safety stock multiplied by the carrying costs per unit.

(iv) Finally, the carrying costs and the expected stock out costs at each safety level should be added, the optimum safety stock would be that level of inventory at which the total of these two costs is the lowest. \(^4\)

3.3 OBJECTIVES OF INVENTORY MANAGEMENT:

- To have stocks available as and when they are required.
- To utilize available storage space, but prevent stock levels from exceeding space availability.
- To meet a high percentage of demand without creating excess stock levels. In other words, neither to over-stock nor to run out is the best policy.
- To maintain adequate accountability of inventory assets.
- To maintain the total volume of replenishment work load within the constraints of acceptable personnel complement.
- To keep all the expenditure within the budget authorization.
- To provide, on item-by-item basis, for re-order points and order such quantity as would ensure that aggregate results conform with the constraints and objectives of inventory control.
- To decide which item to stock and which item to procure on demand.
- To ensure an adequate supply of materials, stores, spares, etc., minimize stock outs and shortages and avoid costly interruption in operations.
• To keep down investment in inventories, inventory carrying cost and obsolescence losses to the minimum.
• To facilitate purchasing economies.
• To eliminate duplication in ordering or in replenishing stocks by centralizing the stores from which purchase requisitions emanate.
• To permit a better utilization of visible stocks by facilitating inter-department transfers within a company.
• To provide a check against losses of materials through carelessness of pilferage.
• To facilitate cost accounting activities by providing a means for allocating material costs of products and departments for comparison with other accounts.
• To enable the mgt. to make costs and consumption comparison between operations and periods.
• To serve as a means for the location and disposition of inactive and obsoletes item of stores.
• To provide a perpetual inventory value and a consistent and reliable basis for the preparation of financial statements.
• To contribute to the nation’s economic well being.
• To contribute to profitability and
• To bring down the inventory carrying cost which is considerable?

3.4 FACTORS INFLUENCING INVENTORY

Lead Time: Lead Time is defined as the period which elapses between the recognition of a need and its fulfillment. There is a direct relationship between lead time and inventory, during lead time, there is no delivery of materials and the consuming departments are served from the existing inventories. Both lead time and consumption rate can be increased without notice, and inventories are generally geared up for this contingency. As lead time increases, inventories increase correspondingly.

Cost of Holding Inventory: Inventories tie up funds. They also expose a firm to a number of risks and cost. The inventory problem is
one of balancing the various costs so that the total cost is minimized. The different costs are material cost, cost of ordering, holding or carrying the inventory, under stocking cost and over-stocking cost.

**Re-order Point:** The re-order point indicates when an order should be placed, and depends upon the consumption rate and the duration of lead time. The simplest method is to place an order when the inventory is depleted to the lead time consumption level.

**Stock:** In inventory control, different terms are used, such as safety stock, reserve stock, buffer stock and so on. The buffer stock provides for normal consumption during an average lead time. The reserve stock provides for an increased consumption rate, while safety stock for an increasing lead time.

**Variety Reduction:** In organizations which have to stock innumerable items, it is imperative to reduce the number of items carried in an inventory, particularly the different small items which are sparingly used. In the case of work-in-progress, the increase in varieties may be due to technical bottlenecks.

**Materials Planning:** Production plans have to be converted into material plans so that the quality and time schedule of requirements may be defined. A divorce of material planning from inventory control result in a tremendous increase in the size of the working capital. Materials planning, to be precise, is a mechanism which perceives the environment for inventory control, to have a successful materials planning, it would be necessary for an organization to adopt a definite methodology, which would take care of internal as well as external factors.

**Service Level:** In practice, the concept of service is more easily handled than the risk of running out of stock. The degree of service indicates a percentage of the number of replenishment orders which arrive without difficulty and make it possible for a firm to render an adequate service to the customer.

**Obsolete Inventory and Scrap:** An inventory becomes obsolete because of changes in product design or because of technological
changes. Obsolescence cannot be controlled without a proper identification of inventories which might become obsolete from time to time. No manufacturing system can be cent efficient; therefore, there is bound to be some scrap. The quality of scrap can be minimized by rationalizing supply sizes, adopting corrective measures and by the proper maintenance of machines. The salvage of scrap is an art.

**Quantity Discounts:** Quantity discounts are offered by the vendor to the purchasers. In order to induce purchasers, Suppliers often offer a reduced price for bulk orders. As a result:

(i) There is a saving per time period equal to the cost reduction per unit multiplied by the usage per time period.

(ii) Since the order size is big. If discount is taken, there are fewer orders per time unit. There is, thus, a saving in total procurement cost.

There is a change in carrying costs. Less inventory investment is required per unit; but large number of orders results in the provision of more in the inventory.³

### 3.5 WHY INVENTORY EXIST

Some functions of the firm, such as the purchase or raw materials, processing and having finished goods available for sale, have a sequential, physical dependency. Maintenance of inventories allows the firm to decouple these functions so that each can be planned, scheduled, and operated independently. For retail firms, inventory provides customers with selection choices and decouples the purchasing function form the selling function.

**Motives for Holding Inventory:** Economists have established three motives for holding inventories, a transactions motive, a precautionary motive, and a speculative motive. In addition, there may be a contractual reason for holding some inventories.
**Transactions Motive:** The transactions motive for holding inventory is to satisfy the expected level of activities of the firm.

**Precautionary Motive:** The precautionary motive is to provide a cushion in case the actual level of activity is different than anticipated. If demand exceed expectations (either in total or for a particular ingredient), sales will probably either be lost or, if made, less profitable. It is doubtful that many customers will accept a pie topped with anchovies and pineapple as a substitute simply because the restaurant has run out of sausage and pepperoni.

**Speculative Motive:** The speculative motive for holding inventory might entice a firm to purchase a larger quantity of materials than normal in anticipation of making abnormal profits. Advance purchases of raw materials in inflationary times are one form of speculative behavior. A second reason for speculative inventory purchases may involve an anticipated change in a product.

**Contractual Requirements:** Occasionally it may be necessary to carry a certain level of inventory to meet a contractual agreement. Some manufactures require dealers to maintain a specified level of inventory in order to be the sale representative in a particular territory.

### 3.6 INVENTORY POLICIES

Inventory policies have a direct bearing on the financial needs of a firm. The financial executive should anticipate changes in the need for funds and should have knowledge of the implications of changing inventory policies which are consistent with the realities of a firm’s financial position.

Study of inventory management practices prevent in any firm involves various techniques described in the preceding pages but in view of the limitation of information and data available to the researcher, the study of inventory management in sugar industry of
Uttarakhand is based on inventory turnovers and inventory conversion period only followed by analyses of variance.\textsuperscript{3}

3.7 INVENTORY MANAGEMENT IN SUGAR INDUSTRY

Before analyzing inventory management practices in sugar industry the audit reports about inventory management contained in annual reports of sugar units under study reveals the following facts which are significant under the study of inventory management.

INVENTORY VALUATION: The mill society has not followed the mandatory accounting standard As-2 (Accounting standards are the statements code of practice of the regulatory accounting bodies that are to be observed in the preparation and presentation of financial statements. In layman terms, accounting standards are the written document issued by the expert institutes or other regulatory bodies covering various aspects of measurement, treatment, presentation and disclosure of accounting transactions. (Source: www.joshiapte.com.)

On valuation of inventories issued by the institute of charted accountants of India, but has followed its past practice of valuing stock of finished sugar, molasses without considering excise duty liability.

STORES INVENTORY: There is no inventory control system relating to stores inventory. On our examination we found a amount is blocked up in non moving stores items.

(a) Stores are not identified in the form of surplus slow moving and non-moving.

(b) A huge amount is blocked up in non-moving items having considerable value has blocked working capital.

(c) Valuation of store inventory has been made on weighted average price method.
ACCOUNTING POLICIES ABOUT INVENTORY:

Inventories: The valuation of inventory has not been as per mandatory standard As-2 issued by the institute of charted Accountants of India, but following the past practice the management has taken, valued and certified the inventory as under:

(a) Sugarcane : All Cost
(b) Finished Sugar
   a. Levy Sugar : At Govt. Rates
   b. Free Sale Sugar : At Net realizable value or cost price whichever is less
(c) Molasses : At Market price determined by state Govt.
(d) Sugar in Process : Valued on cost of sugar vane added with manufacturing expenses thereon.
(e) Molasses in process : At market price net realizable price
(f) Baggage : At market price
(g) Stores : At weighted average cost

The evaluation of inventory is significant from the standpoint of both the balance sheet and the income statement. In the former, the inventory influences the current assets, the total assets, the ratio of current assets and current liabilities and working capital. In the later the inventory evaluation may influence the sale and the profits. ⁵(V.K. Bhalla P. 373)

In view of the above, an attempt has been made to analyze inventory management practices in sugar industry by taking inventory as components of the current assets, the total assets, working capital, the ratio of current assets and current liabilities along with its impact on profitability.
INVENTORY TURNOVER:

Inventory turnover ratios of all the units under study have been tabulated year wise in table No. 3.1 this turnover ratio has been calculated as under:

The inventory turnover ratio is shown as

\[
\text{SALES} \quad \frac{\text{AVERAGE STOCK}}{}
\]

<table>
<thead>
<tr>
<th>Year</th>
<th>FIRM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>KSCML-G</td>
</tr>
<tr>
<td>2006</td>
<td>1.09</td>
</tr>
<tr>
<td>2007</td>
<td>1.19</td>
</tr>
<tr>
<td>2008</td>
<td>1.50</td>
</tr>
<tr>
<td>2009</td>
<td>0.10</td>
</tr>
<tr>
<td>2010</td>
<td>1.51</td>
</tr>
<tr>
<td>Total</td>
<td>5.39</td>
</tr>
<tr>
<td>Average</td>
<td>1.078</td>
</tr>
</tbody>
</table>

Source: Compiled from Annual Reports.

INVENTORY CONVERSION PERIOD OR STOCK VELOCITY

Sometimes, the stock velocity may be calculated in terms of period i.e, to know the time taken to clear the stock, is referred to as inventory conversion period. It is calculated as:-

\[
\text{Inventory Conversion Period (ICP)} = \frac{\text{No. of days in}}{\text{Inventory Turnover}}
\]

Or

Stock Velocity
INVENTORY CONVERSION PERIOD (No. of Days)

Table No. 3.2

<table>
<thead>
<tr>
<th>Years</th>
<th>KSCML-G</th>
<th>BCSFL</th>
<th>KSCML-N</th>
<th>KSCML-S</th>
<th>KSCL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>335</td>
<td>297</td>
<td>315</td>
<td>290</td>
<td>315</td>
</tr>
<tr>
<td>2007</td>
<td>307</td>
<td>297</td>
<td>223</td>
<td>294</td>
<td>243</td>
</tr>
<tr>
<td>2008</td>
<td>243</td>
<td>514</td>
<td>451</td>
<td>420</td>
<td>553</td>
</tr>
<tr>
<td>2009</td>
<td>3650</td>
<td>297</td>
<td>292</td>
<td>307</td>
<td>312</td>
</tr>
<tr>
<td>2010</td>
<td>242</td>
<td>170</td>
<td>183</td>
<td>119</td>
<td>80</td>
</tr>
<tr>
<td>Total</td>
<td>4777</td>
<td>1575</td>
<td>1464</td>
<td>1430</td>
<td>1503</td>
</tr>
<tr>
<td>Average</td>
<td>955</td>
<td>315</td>
<td>293</td>
<td>286</td>
<td>301</td>
</tr>
</tbody>
</table>

Source: Computed by Researcher from Annual Reports of the firm.

Unit wise analysis:

**KSCML-G**: From 2006 to 2008 inventory turnover slightly increased but in 2009 it decreased to 0.10 and in 2010 this turnover again increased and lead to 1.51 times.

**BCSFL**: In 2006, 07 and 09 there was no consistency in inventory turnover but in 2008 it was decreased to 0.71 times and in 2010 it was again just double increased i.e, 2.15 times.

**KSCML-N**: From 2006 to 2007 this turnover slight increased i.e, 1.16 to 1.64 times but in 2008 it was decline to 0.81 times thereafter in 2009 and 2010 it went on increasing trend.

**KSCML-S**: There was declining pattern from 2006 to 2008 but in 2009 and 2010 it showed increasing trend and lead to 3.08 time which was highest in 2010.

**KSCL**: This table showed increasing trend except in 2008 i.e, 0.66 times which was lowest in this year and lead to 459 times which was highest in the year 2010.

The average inventory turnover of KSSCML-G, BCSFL, KSCML-N, KSCML-S and KSCL during the study period was 1.078, 1.31, 1.37, 1.528 and 1.818 respectively. Generally higher the
inventory turnover ratio, the shorter is the average time between investment in stocks and sales transaction on the other hand, a low inventory turnover ratio signifies over investment or excessive inventory.

**SIGNIFICANCE:** If the ratio is high, it indicates the efficiency of management in converting stock into cash quickly, sound loquacity position and quality of goods maintained. A high turnover rate may be unprofitable, unless the stock is turned over at a satisfactory net profit. However, a high turnover is usually indicative of efficient operations, provided that the unprofitable out of stock conditions do not result from a fast rate of sales at a dangerously low level of inventory.

Thus, KSCL showed effective management of inventory. The other table shows the inventory conversion period. The lesser the number of days more quickly the inventory is sold. Thus, the average number of days of KSCML-S is lesser that other industries. Hence, it is showing effective management of inventory. The above data can be represented with the help of following graph.

**INVENTORY TURNOVER (ONE WAY ANOVA TEST)**

**Null Hypothesis:** There is no significant difference in inventory turnover of firm under study.

**Alternative Hypothesis:** There is significant difference in inventory turnover of firms under study.

<table>
<thead>
<tr>
<th>Level of Significance</th>
<th>5 percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Value</td>
<td>3.01</td>
</tr>
<tr>
<td>Degree of freedom</td>
<td>16</td>
</tr>
</tbody>
</table>
INVENTORY TURNOVER RATIO
(ONE WAY ANOVA TEST)

Table No. 3.3

<table>
<thead>
<tr>
<th>Sum of variance</th>
<th>Sum of Squares</th>
<th>Degree of freedom</th>
<th>Mean sum of squares</th>
<th>Calculated value of F</th>
<th>Tabulated Value Fat 5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years</td>
<td>10.277</td>
<td>4</td>
<td>2.569</td>
<td>6.783</td>
<td>3.01</td>
</tr>
<tr>
<td>District</td>
<td>1.500</td>
<td>4</td>
<td>0.375</td>
<td>0.990</td>
<td>3.01</td>
</tr>
<tr>
<td>Error</td>
<td>6.060</td>
<td>16</td>
<td>0.378</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Since, the calculated value of F for year is more than the tabulated value of F, we accept the alternative hypothesis and conclude that there is significant difference between them.
Graph No. 3.1

Inventory Turnover Ratio

Graphs showing the inventory turnover ratio for different years and entities.
Percentage of Inventory in current Assets: Percentage of Inventory in current Assets of all the units under study have been tabulated year wise in table No. 3.4. It has been calculated as under:

Table No. 3.4

<table>
<thead>
<tr>
<th>Year</th>
<th>KSCML-G</th>
<th>BCSFL</th>
<th>KSCML-N</th>
<th>KSCML-S</th>
<th>KSCL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>92</td>
<td>88</td>
<td>80</td>
<td>88</td>
<td>81</td>
</tr>
<tr>
<td>2007</td>
<td>91</td>
<td>88</td>
<td>67</td>
<td>88</td>
<td>78</td>
</tr>
<tr>
<td>2008</td>
<td>92</td>
<td>94</td>
<td>79</td>
<td>89</td>
<td>86</td>
</tr>
<tr>
<td>2009</td>
<td>88</td>
<td>92</td>
<td>74</td>
<td>93</td>
<td>87</td>
</tr>
<tr>
<td>2010</td>
<td>85</td>
<td>65</td>
<td>64</td>
<td>78</td>
<td>54</td>
</tr>
</tbody>
</table>

Source: Completed from Annual Reports.

Unit wise analysis:

KSCML-G: This table reveals that in 2006 percentage of inventory in current assets 92% after that it slightly decreased and increased in 2007 and 2008 respectively i.e, 91% in 2007 and 92% in 2008 but in 2009 and 2010 again it decreased to 88% and 85% respectively. In 2006 and 2008 highest percentage of stock in current assets showed.

BCSFL: In 2006 and 2007 same percentage of stock in current assets showed by this table i.e, 88% but in 2008 it increased to 94% which was highest in this year thereafter it went on declining trend and lead to 65% which was lowest in 2010.

KSCML-N: Inventory in current assets 80% which was highest in the year 2006 thereafter there was increase and decrease during this study period and lead to 64 percent which was lowest in the year 2010.

KSCML-S: In 2006 and 2007 percentage of inventory in current assets remained constant i.e, 88% after that it went on increasing trend and lead to 93% which was highest in 2009 but in 2010 in decreased to 78% which was lowest in this year.
KSCL: In 2007 percentage of inventory in current assets decreased to 78% from 81% in 2006 after that it went on the year 2009 increasing track and lead to 87% which was highest in but in 2010 again it decreased to 54% which was lowest in this year.

PERCENTAGE OF INVENTORY IN CURRENT ASSETS
(One way Anova Test)

Null Hypothesis: There is no significant difference in percentage of inventory in current assets of firm under study.

Alternative Hypothesis: There is significant difference in percentage of inventory in current assets of firms under study.

Level of Significance : 5 percent
Critical Value : 3.01
Degree of freedom : 16

PERCENTAGE OF INVENTORY IN CURRENT ASSETS
(ONE WAY ANOVA TEST)
Table No. 3.5

<table>
<thead>
<tr>
<th>Sum of variance</th>
<th>Sum of Squares</th>
<th>Degree of freedom</th>
<th>Mean sum of squares</th>
<th>Calculated value of F</th>
<th>Tabulated Value Fat 5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years</td>
<td>1182.56</td>
<td>4</td>
<td>295.64</td>
<td>10.413</td>
<td>3.01</td>
</tr>
<tr>
<td>District</td>
<td>1015.36</td>
<td>4</td>
<td>253.84</td>
<td>8.941</td>
<td>3.01</td>
</tr>
<tr>
<td>Error</td>
<td>454.24</td>
<td>16</td>
<td>28.39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Since, the calculated value of F for year is more than the tabulated value of F, we accept the alternative hypothesis and conclude that there is significant difference between them.
Graph No. 3.2

PERCENTAGE OF INVENTORY IN CURRENT ASSETS

[Graph showing the percentage of inventory in current assets for the years 2006, 2007, 2008, 2009, and 2010 for different categories: KSCML-G, BCSFL, KSCML-N, KSCML-S, and KSCL.]
**Percentage of inventory in total assets**: Percentage of inventory in total assets of all units under study have been tabulated year wise in table No 3.6. It has been calculated as under.

**Percentage of Inventory in total assets (in percentage)**

**Table No. 3.6**

<table>
<thead>
<tr>
<th>Year</th>
<th>KSCML-G</th>
<th>BCSFL</th>
<th>KSCML-N</th>
<th>KSCML-S</th>
<th>KSCL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>37</td>
<td>70</td>
<td>62</td>
<td>32</td>
<td>60</td>
</tr>
<tr>
<td>2007</td>
<td>29</td>
<td>62</td>
<td>35</td>
<td>27</td>
<td>49</td>
</tr>
<tr>
<td>2008</td>
<td>34</td>
<td>64</td>
<td>42</td>
<td>28</td>
<td>56</td>
</tr>
<tr>
<td>2009</td>
<td>33</td>
<td>55</td>
<td>34</td>
<td>26</td>
<td>52</td>
</tr>
<tr>
<td>2010</td>
<td>24</td>
<td>27</td>
<td>23</td>
<td>20</td>
<td>34</td>
</tr>
</tbody>
</table>

Source: Compiled from Annual Reports.

**Unit wise analysis**

**KSCML-G**: This table demonstrates that percentage of inventory in total assets fluctuating during this study period. In 2006 this percentage 37 which was highest in this year and after fluctuation this percentage leads to 24 which was lowest in the year 2010.

**BCSFL**: This table reveals that percentage of inventory in current assets 70% which was highest in the year 2006 thereafter there was increase and decrease during the study period and lead to 27 percent which was lowest in the year 2006.

**KSCML-N**: Percentage of inventory in total assets 62% which was highest in the year 2006 after that there was increase and decrease during the study period and lead to 20% which was lowest in the year 2010.

**KSCML-S**: During the study period there was increase and decrease. In 2006 percentage of inventory in total assets showed 60% which was highest in this year and lead to 34% which was lowest in the year 2010.
KSCL: In 2006 it showed 60 percent which was highest in this year and there was increase and decrease during the study period and lead to 34% which was lowest in the year 2010.

PERCENTAGE OF INVENTORY IN TOTAL ASSETS
(One way Anova Test)

Null Hypothesis: There is no significant difference in percentage of inventory in total assets of firm under study.

Alternative Hypothesis: There is significant difference in percentage of inventory in total assets of firms under study.

Level of Significance : 5 percent
Critical Value : 3.01
Degree of freedom : 16

PERCENTAGE OF INVENTORY IN TOTAL ASSETS
(One way Anova Test)
Table No. 3.7

<table>
<thead>
<tr>
<th>Sum of variance</th>
<th>Sum of Squares</th>
<th>Degree of freedom</th>
<th>Mean sum of squares</th>
<th>Calculated value of F</th>
<th>Tabulated Value Fat 5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years</td>
<td>1934.8</td>
<td>4</td>
<td>483.7</td>
<td>0.408</td>
<td>3.01</td>
</tr>
<tr>
<td>District</td>
<td>2398.8</td>
<td>4</td>
<td>599.7</td>
<td>0.506</td>
<td>3.01</td>
</tr>
<tr>
<td>Error</td>
<td>18928.4</td>
<td>16</td>
<td>1183.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>18928.4</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Since, the calculated value of F for year is less than the tabulated value of F, we accept null hypothesis and conclude that there is no significant difference between them.
Graph No. 3.3
PERCENTAGE OF INVENTORY IN TOTAL ASSETS

Percentage Of Inventory In Total Assets 2006
- KSCML-G
- BCSFL
- KSCML-N
- KSCML-S
- KSCL

Percentage Of Inventory In Total Assets 2007
- KSCML-G
- BCSFL
- KSCML-N
- KSCML-S
- KSCL

Percentage Of Inventory In Total Assets 2008
- KSCML-G
- BCSFL
- KSCML-N
- KSCML-S
- KSCL

Percentage Of Inventory In Total Assets 2009
- KSCML-G
- BCSFL
- KSCML-N
- KSCML-S
- KSCL

Percentage Of Inventory In Total Assets 2010
- KSCML-G
- BCSFL
- KSCML-N
- KSCML-S
- KSCL
IMPACT OF INVENTORY TURNOVER ON PROFITABILITY

Impact of Inventory Turnover On Profitability has been showed as table No. 3.8 the following has calculated as under:

Table No. 3.8

<table>
<thead>
<tr>
<th>Year</th>
<th>KSCML-G</th>
<th>BCSFL</th>
<th>KSCML-N</th>
<th>KSCML-S</th>
<th>KSCL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inventory turnover</td>
<td>Working Capital</td>
<td>Inventory turnover</td>
<td>Working Capital</td>
<td>(in crores)</td>
</tr>
<tr>
<td>2006</td>
<td>1.09</td>
<td>-5.26</td>
<td>1.23</td>
<td>-3.22</td>
<td>1.16</td>
</tr>
<tr>
<td>2007</td>
<td>1.19</td>
<td>-17.38</td>
<td>1.23</td>
<td>-18.03</td>
<td>1.64</td>
</tr>
<tr>
<td>2008</td>
<td>1.50</td>
<td>-13.40</td>
<td>0.71</td>
<td>-1.10</td>
<td>0.81</td>
</tr>
<tr>
<td>2009</td>
<td>0.10</td>
<td>+0.67</td>
<td>1.23</td>
<td>-2.24</td>
<td>1.25</td>
</tr>
<tr>
<td>2010</td>
<td>1.51</td>
<td>-14.19</td>
<td>2.15</td>
<td>-5.35</td>
<td>1.99</td>
</tr>
</tbody>
</table>

Source: Compiled from Annual Reports
Unit wise Analysis

**KSCML-G:** This table demonstrate that from 2006 to 2008 inventory turnover increased on the other hand loss also declined but in 2009 inventory turnover decreased and loss changed in profit thereafter again this turnover increased and profit changed into loss in the year 2010.

**BCSFL:** In 2006 and 2007 this turnover remains constant on the other hand loss increased from 3.22 to 18.03. In 2008 this turnover and loss both were decreased after that in 2009 and 2010 inventory turnover and loss both were increased.

**KSCML-N:** From 2006 to 2007 inventory turnover and loss both were increased but in 2008 both were decreased and 2009 and 2010 inventory turnover increased on the other hand loss decreased in 2009 and increased in 2010.

**KSCML-S:** From 2006 to 2008 inventory turnover went on declining trend on the contrary loss also declining after that this turnover increased in 2009 and 2010 but loss in 2009 went on decline and in 2010 it increased and lead to 8.58.

**KSCL:** From 2006 to 2007 inventory turnover increased in 2006 there was loss but in 2007 and 2008 there was no profit no loss after that in 2009 and 2010 inventory turnover increased on the other hand there was loss in 2009 but profit 2010.
Graph No. 3.4
IMPACT OF INVENTORY ON PROFITABILITY

YEAR 2006

YEAR 2007

YEAR 2008

Legend:
- KSCML-G (I.T)
- PROFIT.(IN CRORE)
- BCSFL (I.T)
- PROF.(IN CRORE)
- KSCML-N (I.T)
- PROFIT.(IN CRORE)
- KSCML-S (I.T)
- PROFIT.(IN CRORE)
- KSCL (I.T)
- PROFIT.(IN CRORE)
Relationship between inventory turnover & working capital has been showed as table No. 3.9 the following has calculated as under:

<table>
<thead>
<tr>
<th>Year</th>
<th>KSCML-G Inventory turnover</th>
<th>KSCML-G Working Capital</th>
<th>BCSFL Inventory turnover</th>
<th>BCSFL Working Capital</th>
<th>KSCML-N Inventory turnover</th>
<th>KSCML-N Working Capital</th>
<th>KSCML-S Inventory turnover</th>
<th>KSCML-S Working Capital</th>
<th>KSCL Inventory turnover</th>
<th>KSCL Working Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>1.09</td>
<td>28.59</td>
<td>1.23</td>
<td>40.61</td>
<td>1.16</td>
<td>45.87</td>
<td>1.26</td>
<td>20.10</td>
<td>1.16</td>
<td>61.72</td>
</tr>
<tr>
<td>2007</td>
<td>1.19</td>
<td>12.18</td>
<td>1.23</td>
<td>31.57</td>
<td>1.64</td>
<td>18.88</td>
<td>1.24</td>
<td>4.07</td>
<td>1.50</td>
<td>41.74</td>
</tr>
<tr>
<td>2008</td>
<td>1.50</td>
<td>27.02</td>
<td>0.71</td>
<td>41.50</td>
<td>0.81</td>
<td>27.94</td>
<td>0.87</td>
<td>10.36</td>
<td>0.66</td>
<td>64.35</td>
</tr>
<tr>
<td>2009</td>
<td>0.10</td>
<td>38.44</td>
<td>1.23</td>
<td>54.14</td>
<td>1.25</td>
<td>21.61</td>
<td>1.19</td>
<td>24.64</td>
<td>1.17</td>
<td>29.51</td>
</tr>
<tr>
<td>2010</td>
<td>1.51</td>
<td>28.02</td>
<td>-20.84</td>
<td>59.77</td>
<td>1.99</td>
<td>22.25</td>
<td>4.59</td>
<td>74.24</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Compiled from Annual Reports
Unit wise Analysis

**KSCML-G:** This table demonstrate that inventory turnover increased from 2006 to 2007 on the other side working capital decreased. In 2008 this turnover decreased but working capital increased and in 2010 inventory turnover increased and working capital decreased.

**BCSFL:** From 2006 to 2007 inventory turnover remain constant and working capital decreased. In 2008 this turnover decreased and working capital increased thereafter it went on increasing trend in 2009 and 2010 on the other side working capital also increased.

**KSCML-N:** From 2006 to 2007 this turnover increased and working capital decreased. In 2008 this turnover decreased and working capital increased after that inventory turnover went on increasing trend on the other side working capital decreased in 2009 and increased in 2010.

**KSCML-S:** From 2006 to 2008 inventory turnover went on declining trend after that it increased to 1.19 and 3.08 in 2009 and 2010 respectively. On the other hand working capital decreased in 2007 and increased in 2008 and 2009 but decreased in 2010.

**KSCL:** Inventory turnover increased from 2006 to 2007 and decreased in 2008 on the other side working decreased from 2006 to 2007 and increased in 2008 after that it went on increasing on the other hand working capital fluctuate during the study period.
Graph No. 3.5

RELATIONSHIP BETWEEN INVENTORY TURNOVER AND WORKING CAPITAL

YEAR 2006

YEAR 2007

YEAR 2008
Relationship between inventory turnover & current ratio has been showed as table No. 3.10 the following has calculated as under:

<table>
<thead>
<tr>
<th>Year</th>
<th>KSCML-G</th>
<th>BCSFL</th>
<th>KSCML-N</th>
<th>KSCML-S</th>
<th>KSCL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inventory turnover</td>
<td>Current Ratio</td>
<td>Inventory turnover</td>
<td>Current Ratio</td>
<td>Inventory turnover</td>
</tr>
<tr>
<td>2006</td>
<td>1.09</td>
<td>6.53</td>
<td>1.23</td>
<td>3.27</td>
<td>1.16</td>
</tr>
<tr>
<td>2007</td>
<td>1.19</td>
<td>1.64</td>
<td>1.23</td>
<td>2.08</td>
<td>1.64</td>
</tr>
<tr>
<td>2008</td>
<td>1.50</td>
<td>2.32</td>
<td>0.71</td>
<td>2.08</td>
<td>0.81</td>
</tr>
<tr>
<td>2009</td>
<td>0.10</td>
<td>5.81</td>
<td>1.23</td>
<td>1.66</td>
<td>1.25</td>
</tr>
<tr>
<td>2010</td>
<td>1.51</td>
<td>4.02</td>
<td>2.15</td>
<td>0.89</td>
<td>1.99</td>
</tr>
</tbody>
</table>

Source: Compiled from Annual Reports
Unit wise Analysis

**KSCML-G:** Inventory turnover from 2006 to 2010 went on increasing trend except in the year 2009 on the contrary current ratio of this firm decline from 2006 after that it went on increasing upto 2009 and in 2010 again in decreased.

**BCSFL:** In 2006 and 2007 inventory turnover remained constant after that it decreased but in 2009 & 2010 it went on increasing on the other hand current ratio in 2007 decline from 2006 and in 2008 it remained constant thereafter it went on declining trend.

**KSCML-N:** In 2007 inventory turnover increased from 2006 and in 2008 it decreased to 0.81 after that it went on increasing and lead to 1.99 times in 2010. On the other side current ratio continuously declining from 2006 to 2010.

**KSCML-S:** Inventory turnover decline from 2006 to 2008 thereafter it went on increasing and lead to 3.08 times, on the contrary there was decrease and increase in current ratio during this study period.

**KSCL:** This table reveals that as like all firms inventory turnover went on declining from 2006 to 2008 after that it went on increasing and lead to 4.59 times in 2010. On the other side current ratio showed decrease and increase during this study period.
Graph No. 3.6
RELATIONSHIP BETWEEN INVENTORY TURNOVER AND CURRENT RATIO

2006

YEAR 2007

YEAR 2008

254x732
REFERENCES