Chapter VIII

Summary and Conclusions

This study on inventory management in the public sector electrical industry in Kerala has been taken up with the overall objective of evaluating the savings in inventories of electrical products. The specific objectives of the study are:

1. Get an overall view of the system of inventory management in the public sector electrical industry in Kerala.
2. Assess the positions and levels of inventory in the electrical undertakings.
3. Analyse the inventory management policies and practices followed by the electrical undertakings.
4. Analyse the organisational set-up for materials in the electrical undertakings.
5. Examine the liquidity of the electrical undertakings.
6. Examine whether there are any selective and analytical techniques of inventory management in the electrical industry run by the State of Kerala and if so, to analyse its working and management attitudes towards it.
(7) Compare and contrast the inventory policies of one undertaking with those of the others.

(8) Suggest measures based on the findings of the study for the improvement of the working of the system, wherever possible.

The hypotheses formulated for this study are:

(1) The existing organisational set-up, practices and systems are inadequate to ensure efficient management of inventories in electrical industry.

(2) Inventory constitutes the largest proportion of the working capital in electrical undertakings run by the State of Kerala.

(3) Efficiency in management of inventories leads to improvement of profitability of the concern.

(4) Introduction of scientific inventory techniques has a favourable effect on the working of inventory departments.

(5) There is no uniform inventory policy on the working of the material departments of the various electrical undertakings.

(6) The inventory cost of the public sector electrical undertakings in Kerala is much higher than that of the private sector electrical undertakings.

(7) The financial performance of the public sector electrical undertakings is not at all satisfactory on
account of the high raw material costs, heavy borrowings and huge interest burdens.

The present study infers that public sector electrical undertakings in Kerala have achieved a big breakthrough in their performance during the last few years. There are five electrical undertakings established by the State Government. The total investment in these undertakings comes to about ₹10,569.68 lakhs. Their turnover during 1989-90 was ₹8,283.02 lakhs with a return of 0.39 per cent on the capital employed. These undertakings provide employment for about 3,521 persons and the total inventory held by them comes to ₹2,697.30 lakhs.

Inventory forms the largest proportion of the working capital in the public sector electrical undertakings in Kerala. But it is found that the existing organisational set-up and practices are inadequate to ensure efficient management of inventories. The financial performance of these undertakings is not at all satisfactory compared with the private sector electrical industrial units on account of the high raw material cost, heavy borrowings and huge interest burden. In such a situation, the introduction of scientific inventory techniques will have a favourable effect on the working of inventory departments. Hence the
functions related to inventories are to be toned up to materialize the object of increased profitability. The materials personnel in these undertakings have also be specially trained and should be made conversant with the modern tools and techniques of inventory management. The status, remuneration and delegation of powers of these personnel should also be adequate to carry out these functions most effectively and efficiently.

In the following pages the conclusions of the study are presented. Suggestions for further study have also been mentioned.

Organisational Set-up for Materials

The study reveals that an integrated organisational set-up for materials department would enable reduction in the overall cost of materials on account of the following reasons:

(1) In the process of converting raw materials into finished products they pass through several stages. All of them are different stages of a single function. In order to make this function efficient and economic, effective co-ordination and control of this flow is essential and a single line of command is necessary.
(2) Low cost of purchases as a result of annual purchase contracts, material substitution and value analysis.

(3) Maximum inventory turnover by regulated ordering, selective inventory control and a staggered material flow.

(4) Minimum shortage with continuous flow of supplies through proper specifications, standardisation and selective inspection of incoming materials.

(5) Reliable sources of supply and cordial relations with the suppliers through prompt payment, proper public relations and periodical discussions on product development.

(6) In an integrated structure, when material or inventory costs or any other costs are out of tune, it is easy to pinpoint the weak link in the material chain and take remedial action in time as there is no dividing line of responsibility.

(7) Integrated set-up resolves conflicts and forces co-ordination between purchasing and production control departments as both these departments report to a single boss—material manager. This improves the capabilities and motivation of personnel resulting in better efficiency and output.

(8) An uninterrupted material flow is highly essential in an automated production. This flow can be achieved only through a streamlined integrated materials set-up.
(9) The recurring shortage of basic raw materials evident in today's economy calls for an integrated material structure as a requirement for business survival.

(10) The make or buy policy decision of an undertaking also necessitates integrated materials structure. When the cost of a product can be reduced, the emphasis is on buying parts rather than making them. This raises the volume of purchases which simultaneously raises the inventory holding.

(11) Integration avoids overlapping of functions and thereby reduces the number of personnel required for the department.

(12) Integration ensures rapid transfer of data through effective and informal communication channel.

The study also reveals that the materials manager who has the overall responsibility for purchasing, production planning, inventory control and distribution and traffic is required to report only to the chief executive.

A central material manager who has co-equal status with those in engineering and production departments enjoys better support and co-operation in the accomplishment of materials function. This creates an atmosphere of trust and better relations between the user departments and materials department.
The concept of integrated materials management has gained greater acceptance only very recently in the field of public sector electrical undertakings in Kerala. Although these undertakings may not adopt a totally integrated approach, there is a definite tendency to move towards the integrated approach. Hence the first hypothesis is accepted.

**Working Capital and Inventory**

The working capital efficiency in the public sector electrical industry in Kerala is far from satisfactory. The gross current assets of the undertakings form the regular input into the business. These are converted into output which, on being sold, brings in money to the organisation. The liquid portion of the gross figure is utilised for meeting day-to-day business commitments.

The study reveals that inventory constitutes a substantial portion of the current assets in the UEI, where it is between 60 per cent and 70 per cent (Table 4.5). But in all other undertakings inventory constitutes less than 40 per cent of the current assets. Hence the second hypothesis is accepted.
The average inventory held is more than six months' consumption need (Table 4.6). The average current ratio is 1.5:1 while in the KEL it is significantly higher figure. Thus it can be inferred that as the quick ratio increases the credibility of the concern will also increase. This is because the trade creditors will feel more secure about the amounts they have extended. As the value of quick ratio can be increased by decreasing the inventories, better inventory management increases credibility and liquidity.

The Gross Operating Cycle showed a diminishing trend from 1981-82 to 1989-90 except during 1983-84 and 1987-88 (Table 4.11). This was due to steep rise of work-in-progress conversion period and the increase of book debts conversion period during 1983-84 and 1987-88 (Table 4.15). The net operating cycle showed an increasing trend up to 1984-85 and it became negative afterwards. This was on account of the decreasing trend of the payment deferral period from 1985-86 to 1989-90 (Table 4.16).

In the light of the analysis of the operating cycle, it is found that inventory in the form of raw materials and stores, work-in-progress and finished goods contributes to more than 80 per cent of the total period of the operating cycle. It follows at once that with a given quantum of
working capital, the turnover rate can be increased by reducing any one or more of the four components of the cycle. While credit availability and collection period depend on external market conditions, better inventory management leads to reduction of the time in the storage periods. Hence the performance of the organisation can be improved by better internal management itself.

Some Concepts about Inventories

Having analysed the sales of the undertakings, it is found that direct materials and indirect materials forming part of the overhead cost, constituting inventories, account for a large percentage of total cost. The various costs relating to materials are; cost of ordering, cost of carrying inventory, understocking cost and overstocking cost. The major component of ordering cost is salary. In order to control this, the number of men in purchasing should be kept as low as possible. Hence any jump in the total salary should not be allowed unless there is a corresponding increase in the number of orders. It will be cheaper to use overtime when there is a marginal increase in the number of orders.
The inventory carrying cost comes around 30 per cent of the average inventory held. This can be reduced further through the disposing of surplus inventories and adopting modern techniques of inventory management.

The study asserts that both overstocking and understocking of inventories are costly to the concern. Hence it is necessary to balance one against the other through continuous checking.

The analysis also shows that there is direct relationship between lead time and inventories of the concern. When lead time increases the inventories will have to increase correspondingly. Of the various components of lead time, it is found that the procurement or manufacturing lead time is the toughest nut to crack. This should be taken care of while negotiating order and supply details. Administrative and inspection lead time are under the control of the purchaser. Transportation lead time can be reduced by a cost trade off but not below a threshold.

It is also found that the productivity aspect of inventory is often overlooked or is not adequately looked after in most of the concerns. This aspect is positively
rewarding in large measures because inventory is the largest co-partner in the total cost partnership. Hence the third hypothesis is accepted. Hence the third hypothesis is accepted.

A number of techniques are found to be designed and applied in the area of material control. These techniques have spread over all the key areas of inventory management. They range from planning of raw materials to despatching of finished goods to consumer. But it is a tough job to direct the control on material cost at every point.

Tools and Techniques of Inventory Management

The study reveals that the decisions as to which item to make and when to keep inventories in balance require application of a wide range of techniques from simple graphical methods to more sophisticated and complex quantitative techniques. The public sector electrical undertakings in Kerala have adopted certain efficient techniques like A.B.C. analysis, perpetual inventory system etc., for controlling their inventories. But control measures such as E.O.Q. and fixing of material stock levels are not strictly adhered to resulting in a high inventory cost. With the advent of Electronic Data Processing (EDP), better selective inventory control measures are available the adoption of which may lead to better control of
inventory at a reduced cost. Hence the fourth hypothesis is accepted.

A significant fact the study brings to light is that although a major portion of inventory in these undertakings required for production consists of stores and spares, control techniques like VED (Vital, Essential, Desirable) analysis have not so far been adopted. ABC analysis can be combined with VED analysis for control of spare parts inventory. This combination enables a widespread scrutiny for proper provisioning of spare parts. SDE (Scarce, Difficult, Easy) analysis conjoining with HML (High, Medium, Low) analysis will yield suitable guideline for fixing stock levels relating to short supply items. FSN (Fast, Slow, Non-moving) analysis helps weed out the non-moving items and in disposal planning of scraps which too calls for distinct and serious attention.

The study also reveals that no public sector electrical undertaking in Kerala has applied computer for inventory control and other decision making purposes. With mechanisation of industry no modern techniques will be cumbersome in application or time consuming; nor will they be superfluous. It has often been found difficult to control Local Purchases (LP) of materials. Once the repair and maintenance spare parts are out of stock, one cannot obviously wait for the materials management
department to make orders in lots of indents based upon their convenience. But with the help of computers it is possible to control LP and associated disadvantage of lacking economics of scale.

It is found in the study that there is a need to improve the work environment before a full-fledged just-in-time inventory system can be implemented. But the spares and other inventory items which are readily available from the local market could be better managed by the JIT approach of buying. JIT enables the managers to run the project with ready stock and no associated carrying cost.

The analysis also reveals the need for an inventory audit as the inventory and its movement towards production and marketing and the costs involved in are very high. Like internal audit, inventory audit should also be made the routine feature of the undertakings. It may be done with the required qualified hands within the organisation or by outside inventory audit teams. During inventory audit the items like raw materials, work-in-progress, finished goods, stores and spares, loose tools and others and by-products and scraps should be audited with due care to effect economy in the organisation. Hence the fifth hypothesis is accepted.
Inventory Ratios

The study reveals that the value of inventory in the public sector electrical industry in Kerala showed an increasing trend from 1980-81 to 1989-90 (Table 7.5). But the per cent of inventories to current assets decreased by 5.82 during 1989-90 when compared to that of 1980-81 (Table 4.1). Therefore, it is advisable to keep an eye on inventory and its costs in order to keep it under control.

The consumption of raw materials showed a considerable increase from 1980-81 to 1989-90 (Table 7.6). The total consumption of raw material was for ₹.676.33 lakhs during 1980-81 whereas it increased to ₹.5436.74 lakhs during 1989-90. This can be counted as a good indicator of increasing production. But the per cent of inventories to consumption of raw materials decreased by 19.59 during 1989-90 from that of 1980-81.

The value of closing stock of finished goods decreased by ₹.28.14 lakhs during 1983-84 from ₹.368.18 lakhs during 1982-83 and then it increased to ₹.508.56 lakhs during 1984-85 (Table 7.7). This is a sign of wide fluctuation of finished goods inventory on account of the inconsistent level of capacity utilisation.
The amount of sales showed an upward trend from 1980-81 to 1989-90 except during 1983-84 (Table 7.8). This implies a good market condition and high profitability. But the per cent of inventories to sales decreased by 5.48 during 1989-90 from that of 1980-81.

The study also reveals that the inventory turnover ratio increased by 1.60 during 1989-90 (i.e., 3.70) from that of 1981-82 (i.e., 2.10) (Table 7.1). It implies a more efficient use of inventory and a reduction in working capital needs.

The number of days stock in hand is around 140 in the public sector electrical industry in Kerala (Table 7.1). This ratio showed a diminishing trend year by year in the industrial units except in the Traco Cable Company Limited during 1986-87 and 1987-88. This is a sign of increasing efficiency in selling the goods and inventory management.

The return per rupee invested is around (-)0.50, i.e., negative, in the public sector electrical industry in Kerala (Table 7.1). This ratio showed a diminishing trend year by year in the industrial units except in the Traco Cable Company Limited during 1988-89 and 1989-90 and in the United Electrical Industries Limited during 1989-90.
This is an indication of decreasing efficiency in management of inventories in terms of profitability. Hence the sixth and seventh hypotheses are accepted.

Policy Implications

The total activity of the materials department in the public sector electrical undertakings in Kerala must be integrated under one senior manager with the same status as other departmental heads. This helps to obtain meaningful economy, efficiency and savings from the material organisation. This particular aspect is fully neglected in most of the undertakings analysed.

The reputation and performance of an undertaking mainly depend on the people who manage and control it. So persons who deal with the inventories should be carefully selected, oriented, trained and developed. They should have the basic qualifications which would enable them to know about the materials bought and the process through which they are put. They must be specially trained conversant with the modern tools and techniques of inventory management. This is highly essential to enhance their talent and skill in creative buying and decision making. The status, remuneration and delegation of powers of these personnel should also be adequate to carry out the functions effectively and efficiently.
Material managers in most of these undertakings lack some of the requirements and hence special attention is required in training, development and delegation.

The working capital efficiency in the public sector electrical undertakings in Kerala is far from satisfactory. Its requirement depends basically on the length of the operating cycle. Monitoring the cycle thus becomes an important task of the working capital control. In this context the following facts should be kept in mind:

(1) The duration of the raw materials and stores stage depends on the regularity of supply, lead time, degree of persistability, price variations and economics of bulk purchases.

(2) The duration of the work-in-progress stage depends on the duration of production cycle and efficient co-ordination of various inputs.

(3) The duration of the finished goods stage depends on the method of production and sales. If production is fairly uniform throughout the year but sales are mainly seasonal or vice versa, the duration of the finished goods stage tends to be long.

(4) The duration of the receivable stage depends on the credit period allowed to customers, cash discount and credit, and collection policy of the undertaking.
It is found that in the public sector electrical undertakings in Kerala direct materials and indirect materials forming part of the overhead cost, constituting inventories account for a large percentage of total cost. Thus these undertakings cannot simply forget the area of materials and think of surviving in the market. At the same time it is a tough job to direct the control on material at every point. So special attention should be paid to point out the important areas where the possibility of loss is more.

It is also found that the productivity aspect of inventory is not adequately looked after in most of the undertakings. In fact productivity reduces the cost of input and dramatic results can be achieved through better management. So special attention should also be paid to the productivity aspect of inventory.

Internal and external lead time must be improved through proper delegation, responsibility, authority and accountability of the material personnel. Special care should be taken while negotiating the order and supply details for controlling procurement or manufacturing lead time which is a tough task. There is further scope for savings in procurement through cost analysis and negotiation which are not practised at present.
The quantity ordered of different high cost materials is not consistent in most of the undertakings. So it is advisable to follow an economic order quantity technique for these items.

At present, enough attention is not being paid to inventory levels in most of the undertakings. These levels can be reduced further by the use of modern techniques of selective control, just-in-time inventory system, computers and inventory audit.

The turnover ratio in most of the undertakings is also not attractive. This ratio can also be increased if special attention is paid to bring down the level of inventories and prompt action is taken for the disposal of surplus and obsolete items.

Where the aforesaid recommendations are implemented in the public sector electrical undertakings in Kerala the following annual savings are fairly ensured.

When there is an inventory investment of ₹3,000.00 lakhs in the public sector electrical undertakings in Kerala, a saving of 20 per cent of this value is highly attractive and worthwhile.
<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Details</th>
<th>Extent of Saving as percentage of inventory value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Saving through functional integration</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>Economy through improved efficiency of personnel by proper orientation, training, development, delegation and authority</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>Saving through efficient management of working capital</td>
<td>6</td>
</tr>
<tr>
<td>4.</td>
<td>Saving through the concentration of attention in important areas of materials where the possibility of loss is more</td>
<td>2</td>
</tr>
<tr>
<td>5.</td>
<td>Saving through the concentration of efforts on the productivity aspect of inventory</td>
<td>2</td>
</tr>
<tr>
<td>6.</td>
<td>Saving through the reduction of lead time of inventory</td>
<td>2</td>
</tr>
<tr>
<td>7.</td>
<td>Saving from purchasing through Economic Order Quantity</td>
<td>4</td>
</tr>
<tr>
<td>8.</td>
<td>Saving from reduction of inventory levels through better turnover, selective inventory control, JIT, application of computers and inventory audit</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>28</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Less: Expenses for setting up of special cells for specific action, personnel efforts and other incidentals</strong></td>
<td><strong>8</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Net saving assessed</strong></td>
<td><strong>20</strong></td>
</tr>
</tbody>
</table>

* 20 per cent of the inventory value.
Suggestions for Further Study

The new developments in the area of inventory management assume greater significance on account of the huge value of working capital invested in inventories. A further study is, therefore, essential to assess the impact of these suggestions and improvements.