CHAPTER - 6

CONCLUSIONS
The primary aim of manufacturing sectors are concerned with the production of goods and hence "material management" may be regarded as an important element of "production management". Whatever manufacturing strategy may be followed by a manufacturing sector, the primary aim is to maximise profits with minimum resources. Recent developments in manufacturing sectors pay more stress on material management within organisation and at warehouses level in order to reduce inventory and thus maximise profit.

Two major organisational developments during recent years are relevant to this aspect of material management.

1) The trend towards customer orientation brought about by national and international competition and customer awareness.

2) The trend towards the integration of functions within organisation made desirable by the problems created by poor functional interfacing, and facilitated by improving management information system.

Recognition of these developments is having a profound effect on the manner in which many organisations are approaching the task of managing materials.

Considerable research has been done in material
management and the manufacturing techniques, the organisation should follow.

In India no major manufacturing policy encountered these days have been followed up to now. Generally the business organisation follow the tradition policy of inventory control i.e. ABC policy of inventory control. Not much computerisation has taken place in the manufacturing areas as such.

In order to compete in world market for competitive goods, some manufacturing policy suited to Indian conditions and environments has to be evolved. Various countries are spending million of dollars on evolving a manufacturing policy of their own best suited to the conditions and environments prevailing in their countries.

India should follow suit and pursue the research in manufacturing policies in order to arrive at a suitable manufacturing policy.

The major production techniques being followed all over the world are Material requirement planning, i.e. the basic MRP system, the Manufacturing Resource Planning (MRP II), Just-in-Time (JIT) production - The Kanban system, Optimised Production Technology (OPT), Group technology and Flexible Manufacturing Systems.
All of these except the Just-In-Time production are highly computerised and require accurate input data for evolving suitable manufacturing strategies. In India very few business organisations are computerised to that level of computerisation suitable for following these more advanced production techniques. Moreover the input data required should be highly accurate which is rarely so in Indian conditions. Realistic feedback is not forthcoming in Indian conditions for adopting any of these advanced and computerised production techniques.

Rather the most simple and transparent JIT production system requiring less computerisation is the answer to the production policy to be followed in India. Of course some modification might necessarily have to be incorporated for adopting JIT in Indian context by manufacturing sectors. JIT has many fold advantages over other production techniques.

Comparing MRP, JIT, OPT, Group Technology and flexible manufacturing systems, one is inclined to accept the edge JIT has over other production techniques.

MRP software has been available commercially to manufacturing organisations for almost two decades, and has been used by a large number of organisations throughout the world. Since the beginning of the 1980s, JIT and OPT have also become available to Western Companies and
Many have achieved considerable success in terms of reducing inventory and through put-time, minimising set-up times and generally raising productivity. Managers in manufacturing organisations now have a choice when considering production and inventory control systems.

Materials requirements planning systems are fairly well known among managers in industry, Just-In-Time, optimised production technology, Group Technology and Flexible Manufacturing Systems are lessor known. Group Technology and Flexible Manufacturing Systems are in adolescence and their likely impact on manufacturing strategies is not known as yet. So which one of these systems is best for adoption is the question prevailing all over the world in regard to the manufacturing sectors and also can a shift is feasible if an organisation is already following MRP and wants to switch over to another manufacturing policy. In that case whether JIT or OPT to be preferred.

It will be appreciated that the majority of organisations do not have the means to reorganise their facilities at the cost of lost production. The major problems encountered by scheduling manufacturing organisation are determination of batch sizes, production loading and accuracy of input data, flexibility and cost function.
Batch Sizing

Under MRP, batch sizes are normally calculated using some versions of the economic batch quantity model and are usually large due to high costs incurred in set up. Increased batch sizes result in increased lead times and this increases overall costs due to higher interest and storage charges. Both JIT and OPT have overcome the batch sizing problem. Set up times are reduced to a minimum in JIT and do not become a significant factor in determining batch sizes. Under OPT, variable batch sizes are computed and, additionally, the system suggests the reduction of set up times at bottleneck stations, thereby maximising the throughout at bottlenecks and hence of the whole manufacturing facility.

Production Loading and Scheduling

MRP assumes that unlimited resources are available and it schedules batches according to this. Both JIT and OPT schedule production assuming limited capacity, with capacity being controlled by the use of Kanban cards under JIT. In OPT, capacity is controlled by the bottlenecks and the system recognises capacities at both the bottlenecks and non-bottlenecks before scheduling. It also supplies a more complete schedule than JIT, though JIT is faster at doing this than OPT.
Production Waves

Production waves are the end result of departmental delays which compound themselves as batches mostly through the production sequence. Under MRP, production waves are balanced by the use of safety stocks. In JIT, if there is a delay at one work station all the work stations are affected proportionately. Production waves are thus not allowed with JIT as the whole production sequence must be synchronised. Tighter scheduling and spare capacity are used to prevent production waves in OPT.

Accuracy of Data

MRP requires accurate data for the master production schedule, bill of materials, and inventory status files. OPT needs less data accuracy for non-bottleneck work centres and more accurate bottleneck data. Data accuracy becomes almost zero in JIT production, which does not need the use of a computer system, whereas both MRP and OPT require sophisticated computer systems to generate production schedules.

Flexibility

Of the three systems, JIT is the most flexible because of low inventory levels and minimum batch sizes. OPT allows more flexibility than MRP as it also tends to schedule lower levels of inventory and allows for flexible
batch sizes. JIT requires total reorganisation of the production facilities, whereas OPT (and MRP) does not; but OPT still offers similar benefits to those derived from JIT. Also the introduction of OPT does not necessarily affect the whole factory as it can be phased in slowly.

Cost

In operating terms the most costly of the three systems is MRP because data accuracy is critical for all parts of the system. JIT is the least costly because of its negligible data requirements. OPT falls in between MRP and JIT, though it offers many other benefits such as the facility for simulation. Keeping in view all the advantages, JIT has. Over other production techniques, JIT with some modifications as has been suggested in Model 1 of Chapter 2 is the answer for adoption in Indian manufacturing sectors.

Another important aspect of manufacturing sector is procurement function or in other words “material acquisition.”

MATERIAL ACQUISITION

Whatever system is in operation (MRP, JIT, OPT, GT or FMS), the effectiveness of the manufacturing operations, and the eventual delivery of the products
to the customers, can be profoundly influenced by the purchasing or procurement function.

Purchasing involves the following activities:

1. Finalising the specifications of materials or items required by the user department.

2. Purchase lot sizes determination on the basis of user requirements, storage facility available and mode of transportation.

3. Identification of suitable suppliers.

4. Obtaining competitive bids or negotiating prices with a number of the suppliers.

5. Analysing the bids - comparing prices, delivery dates, etc.

6. Preparing and placing the purchase order.

7. Determining and organising the mode of transportation.

8. Expediting the order to ensure delivery at the correct time.

9. Verifying the receipt of the order and checking the invoice for payment.

Other duties may include the processing of claims to suppliers when materials and items do not conform to specifications, and disposing of excess materials and
items. A purchasing group can have many objectives such as

(a) To maintain a steady flow of materials and services in the organisation, so that users departments needs are adequately met and with minimum storage safety factor.

(b) To ensure supply of raw material from existing or alternative source for meeting emergency or unplanned needs.

(c) To maximise efficiency for obtaining the desired value for every unit of expenditure.

(d) To liaison with other departments for managing raw material and item inventories, to achieve minimum storage safety factor and minimising stock out at procurement level in meeting the demands of users department adequately.

(e) To leader advice and information to other departments for achieving the forging objectives.

The procurement function is a critical one regardless of type and size of manufacturing, since it provides the "input" to the operating system around which all other activities are planned. The purchasing function must, therefore, be organised, in such a way that raw materials and items are available at the right time,
in the right quantities of the right specifications and quality, from the right suppliers and at the right price.

An efficiently organised purchasing function can have a significant impact on the operation of the organisation as a whole and therefore must be treated with the importance attached to other functions within the organisation.

Under JIT production, the supply of raw materials and component parts from vendors can be controlled by the Kanban system. In this case the suppliers must be selected with extreme care and they must be in a position to make small and frequent deliveries. More importantly they must be willing to sustain product quality to meet purchasers standards.

Manufacturing organised under JIT system will not tolerate any variations in the quantities and delay in delivered items and this require that buyer and suppliers have a close and special relationship. If there are to be any changes to the delivery schedule in terms of quantities or timing than the supplier must immediately communicate with the buyer for assessing the implication of delay or change in delivery schedule and agree to necessary action as suggested by users department.

Encouraging suppliers to implement Kanban system in their own organisations can result in a number of
benefits. Japanese companies manufacturing under
the JIT system also use JIT purchasing, and over recent
years many USA companies have switched to JIT purchasing
from traditional purchasing practices.

The JIT purchasing concept offers many fold
benefits like

1. The inventory system as a whole is controlled
   at an improved level.
2. Buffer inventories are reduced.
3. Storage space is minimised.
4. Reduce materials handling.
5. Less waste materials.

The JIT purchasing concept can offer significant
benefits to manufacturing organisations, not only in
planning and controlling the supply of raw materials and
component parts, but it also lead to improvements in
quality and overall productivity. Optimised production
technology is the most recently developed system for
controlling production and inventory. It claims to draw
upon the best of MRP and JIT systems. There has been
growing interest in OPT in recent years and in the short
history, substantial benefits have been claimed by
various users.

India being a vast and diversified country
wherein it is not possible to find suitable suppliers at
the nearby places for efficient supply of materials in order to maintain a steady flow of materials to meet users requirement adequately.

In order to overcome this problem the production departments of the organisation needs to be situated at places wherein raw material is available nearby in order to reduce lead time of procurement. The business organisations have to work on regional basis to reduce lead time of procurement as well as lead time of delivery of finished goods to retailers.

Keeping in view the advances made in the manufacturing strategies all over the world, India needs to follow a manufacturing strategy suited to Indian conditions. India has to stay in world market to compete with other advance countries. The advantage of all the manufacturing strategies like MRP, OPT, FMS are many fold but they are very expensive and time consuming to implement.

JIT the most simple and transparent to understand is also less expensive and time consuming and require less computerisation for adoption in Indian conditions. Indian business organisation needs to adopt JIT in order to reduce inventories at all levels of the distribution system. The distribution systems in itself are of many stages. There is a need to reduce the number of
stages in the distribution channel for reducing excessive inventory.

Indian companies should switch over to JIT system of purchasing, production and distribution to reduce the excessive inventories and procurement time. This will result in increased productivity and more profit, the primary aim of all business organisations.

In the mean time considerable research should be carried out to evolve a manufacturing policy of its own in India. A policy which is a combination of JIT, OPT and FMS wherein with the recent computerisation, the simulation software package can be developed to find out the bottlenecks points of manufacturing strategies. It will reduce inventory, set up times and increase production and profitability as a whole.

In order to reduce inventory at all levels there is no need to keep safety stock of the order of 95% or 99%. Keeping a safety stock between 80% to 90% at procurement level and production level will ensure that the retailer service level will be of the order of 95%.

Before arriving at a decision regarding service level to be maintained for ensuring a desired customer level, Business Organisation should perform
simulation exercises on the demand data of previous years projected into future. This will help in reducing excessive inventory.

Manufacturing sectors should be computerised to the extent that simulation software packages can be developed internally for decision making in regard to functional areas individually and integrated together as well.