

## Unit 4

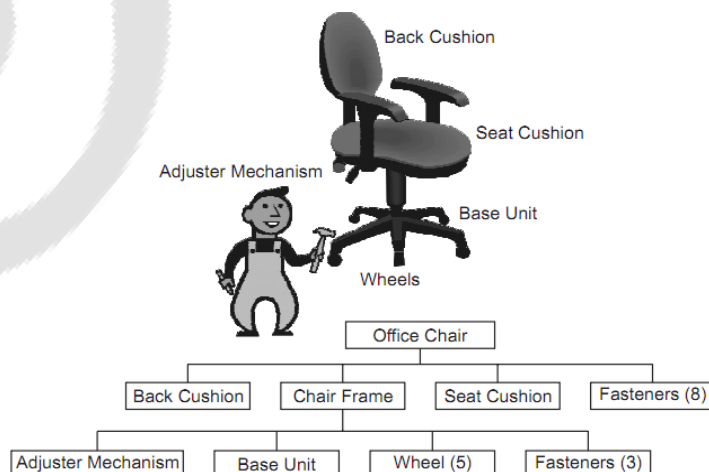
### MATERIALS REQUIREMENT PLANNING(MRP)

- MRP is a method for ordering components than the independent demand inventory models
- MRP : It is a phase in the development of computerized methods for planning the use of company resources , including scheduling raw materials, vendors, production equipments and processes.
- MRP evolved into a comprehensive priority planning system.
- MRP provides a method that helps keep order due dates valid even after the orders have been released to the shop floor or outside vendor.
- MRP systems can detect when the due date of an order – the date the order is scheduled to arrive- is out of alignment with its need date , the date the order is actually required.
- The expanded MRP system became known as **closed loop MRP**, because it provided feedback from the execution function to the planning functions, so manufactures could change plans if necessary.
  - **Closed Loop MRP**
  - Closed loop MRP uses capacity planning & feedback to improve the ability of the production system to complete work as planned.
  - To determine how well the planning factors & tools are working ,MRP planners need feedback from the shopkeeper and purchasing department.
  - With effective feedback MRP planner can revise the planning factors and techniques so that better materials can be developed for future.
- The new system, which was called manufacturing resource planning (MRP-II), was a comprehensive approach for the effective planning of all resources of a manufacturing organization.
- Production & materials planning is critical to the success of a manufacturing company.
- A company can have the best product design, the newest manufacturing facilities, the latest equipment & all the latest production technologies like CAD/CAM, robotics , automated guided vehicles (AGVs) etc. but not the ability to compete.
- MRP has proved to be an effective production & inventory planning system in a wide variety of environments.
- An MRP system requires 3 types of information:
  - Master Production schedule (MSP)
  - Bill of Material (BOM)
  - Inventory Records (IR)
- The MSP is detailed production schedule for finished gods or end items that provides the major input to materials requirement planning process.

- Associated with each finished product is BOM , which describes the dependent demand relationships that exist among the various components materials, parts, subassemblies , etc.- comprising the finished product.
- The entire set of BOMs for the company finished products is called BOM file.
- Inventory status data for each product or component such as stock-in –hand, stock-on order, etc, .are provided by the inventory records, which also contains planning factors like lead time, safety stock, re order, and so on.
- MRP logic uses the MPS, the BOM file & the inventory records to determine the following for the components:
  1. Planned order quantities
  2. Planned order release dates (to shop floor/suppliers)
  3. Planned order due dates
- The MRP system calculates the release dates & due date taking into consideration the lead times required to produce or procure the components and by recognizing the order in which they are assembled into the finished product.
- If the MRP process is carried out in conjunction with the capacity planning, the production facility should have to complete the orders on time.

### **BILL OF MATERIAL (BOM)**

- A BOM defines the relationship of components to end items. The BOM identifies all components used in the production of an item, the ordered quantity & the order in which components are assembled.
- A BOM can define products as they are designed (engineering bill of materials), as they are ordered (sales bill of materials), as they are built (manufacturing bill of materials), or as they are maintained (service bill of materials).
- A bill of material or product is a list of raw material, sub-assemblies, intermediate assemblies, sub-components, parts and the quantities of each needed to manufacture an end product.



→ **Fig. C.1** Bill of Material for the Office Chair

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

- MRP was originally developed as a computer system that was limited to materials planning.
- MRP –II is an expansion of closed loop MRP for managing an entire manufacturing company.
- MRP II system provides information that is useful to all functional areas & encourages cross- functional interaction.
- MRP II supports sales & marketing by providing and orders- promising capability.
- MRP-II is expansion of closed loop .
- Order promising is a method of tying customer's orders to finished goods in the MPS.
- This allow sales personnel to have accurate information on product available & gives them the ability to give customers accurate delivery dates
- MRP II supports financial planning by converting materials schedules into capital requirement.
- A company can use MRP II to simulate the effects of different master production schedules on material usage, labor, & capital requirement.
- MRP II provides the purchasing department with information for developing long range buying plans .
- It is common for suppliers to directly access a customers MRP system to receive up to date information on the customers planned materials needs.
- Information in the MRPII system is used to provide accounting with information on materials receipts to determine accounts payable. Shop floor control information is used to track workers hrs for payroll purposes.
- MRP II system increases a company's efficiency by providing a central source of management information.

## **DISTRIBUTION REQUIRMENT PLANNING**

- DRP is having same logic as of MRP into Physical distribution System. DRP assist companies that maintain distribution inventories in fields warehouse, distribution centers by improving the linkage between marketplace requirements & manufacturing activities.
- It helps mgmt to anticipate future requirements which closely match the supply of products to the demand for them.
- A DRP system also improves savings through improved planning of transportation capacity needs , vehicle dispatching & warehouse receipt planning.
- DPR has a central role in phsical dist. system., similar to MRP's role in coordinating material in manufac. system.

## **PRODUCT DATA MANAGEMENT (PDM)**

- One of the major manufacturing challenges is to maximize the time-to-market benefits of concurrent engineering while maintaining control of the data, and distributing it automatically to the people who need it, when they need it.
- The way PDM systems cope with this challenge is that the master data is secured once in a secure 'vault', where its integrity can be assured as all changes to it monitored, controlled and recorded.
- Duplicate reference copies of the master data, on the other hand, can be distributed freely, to users in various departments for design, analysis and approval.
- The new data is then released back into the vault. When a 'change' is made to the data, signed and dated, is stored in the vault alongside the old data which remains in its original form as a permanent record.

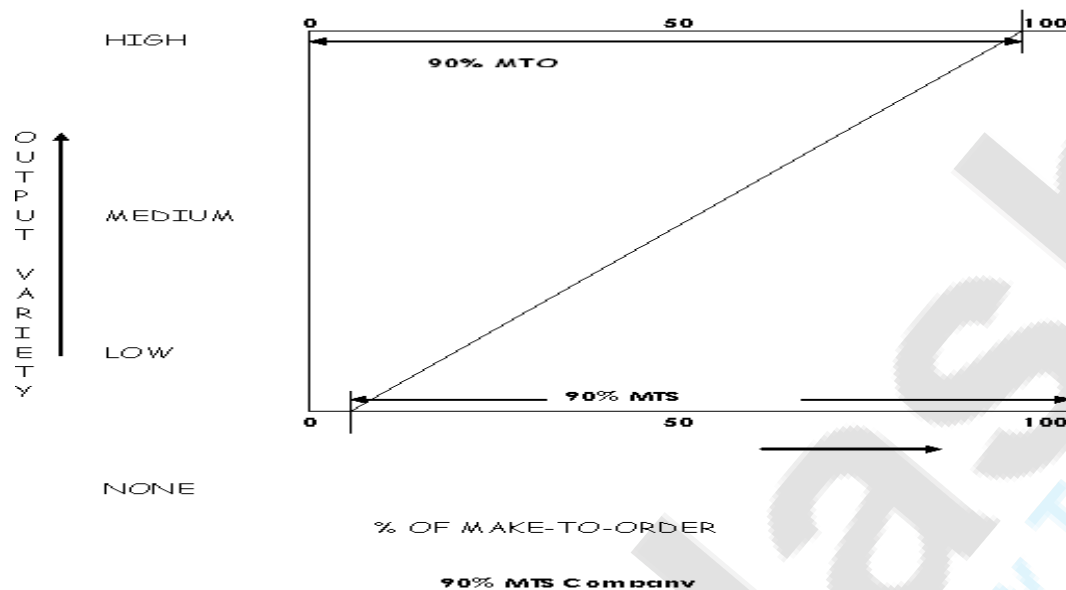
## **PROCESS MANAGEMENT**

- Process management is about controlling the way people create and modify data-active procedures.
- This may sound like a new name for 'project management', but it is not.
- Project management concerns itself only with the delegation of tasks; process management addresses the impact of tasks on data. Process management systems normally have three broad functions:
  - They manage what happens to the data when someone works on it (Work Management).
  - They manage the flow of data between people (Workflow Management).
  - They keep track of all the events and movements that happen in functions 1 and 2 during the history of a project (Work History Management).

## **MAKE-TO-ORDER (MTO) and MAKE-TO-STOCK (MTS)**

- One way to classify the manufacturing operations is by the amount of processing the product requires, after the company receives an order from a customer.
- At one end of the processing spectrum is the make-to-order (MTO) company.
- This company does not begin processing the material for the component or product until it has received an order from the customer.
- In some cases, the company may not even procure the material and components until after it receives the order.
- This type of manufacturing operations is practiced when the company competes on the basis of production planning on firm customer orders.

- Following figure shows the relation between the output variety (degree of customization) and the type of manufacturing operation.



- As is evident from the graph, the output variety is highest when the company is operating in the make-to-order mode, as the companies can serve each & every individual customer in the way he/she wants.
- But the cycle time will be more and the cost of the product will also be more.
- But in the case of a MTS company, the products are already made and kept in the inventory for the customer to pick up.
- Here, the customer won't get any individual attention or customization; he can buy what is available with the company.
- At the opposite end of the spectrum is the make-to-stock (MTS) company, which manufactures products and places them in inventory before it receives customer orders.
- Either the customer purchases the products directly from the inventory at a retail outlet, or the company ships the product 'off-the-shelf' from the finished goods inventory at the factory or at a distribution centre.
- MTS companies rely heavily on market analysis and demand forecasting in planning the production of their products with respect to the product mix and volume.

