KAMARAJCOLLEGE

SELF FINANCING COURSES

(Reaccredited with "A+" Grade by NAAC)

(Affiliated to Manonmaniam Sundaranar University, Tirunelveli.)

STUDY MATERIAL FOR

B.B.A SHIPPING AND LOGISTICS

PRODUCTION AND OPERATIONS MANAGEMENT

SEMESTER – IV

ACADEMIC YEAR 2022 - 2023

PREPARED BY

DEPARTMENT OF B.B.A.(SL)(SF)

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UNIT I

DEFINITION:

Production / Operations Management is defined as the process which transforms the inputs/resources of an organization into final goods (or services) through a set of defined, controlled and repeatable policies. By policies, we refer to the rules that add value to the final output. The value added can be in different dimensions, but the industrial set-up is mostly concerned with the duo of quality and throughput.

PRODUCTION MANAGEMENT V/S OPERATIONS MANAGEMENT

- **Output:** Production management deals with manufacturing of products like (computer, car, etc) while operations management cover both products and services.
- **Usage of Output:** Products like computer/car are utilized over a period of time whereas services need to be consumed immediately
- **Classification of work:** To produce products like computer/car more of capital equipment and less labour are required while services require more labour and lesser capital equipment.
- **Customer Contact:** There is no participation of customer during production whereas for services a constant contact with customer is required.

OBJECTIVES OF PRODUCTION AND OPERATIONS MANAGEMENT

1. Production of goods and services within the parameters of manufacturing cost and minimum possible resource consumption:

The first objective is to produce a great product or service without costing more than is estimated and allowed and consuming resources the most efficiently. Anyone working in accounting or budgeting, as well as anyone working with refining, managing or improving production processes or service rendering works very closely with the prime objective of production management.

2. Ensuring the proper quality of goods and services per regulations:

This is the second objective, and while it's similar to the first, it's about quality assurance. Any group working in customer service/support, as well as research and development, customer experience or similar fields contributes to this. They do so by hearing input from users who will be a window on how good a product or service actually is, in the wild, as well as researching how to improve the product or service to meet these standards if anything falls short.

3. Production within timelines:

Meeting schedules for production of goods and services per the standards of quality, and at the budget allotted is the third objective, and it's one of the harder ones to manage. Anyone working within management within the company pretty much dedicates themselves, through their leadership within their department, to ensure that these goals are met.

4. Ensuring minimal use of resources:

This one sounds repetitive to me, considering the first objective actually kind of states this, but we're going by the clinical definition which does indeed itemize this separately. That's ok, because it gives me a chance to point out that anyone who balances overhead, dedication of man power, costs and resources contributes to this aspect of production management quite heavily.

5. Maximization of manpower utilization:

This is another aspect where everyone in management, team leadership or similar positions are integral components. This is actually different from resources despite man power being a resource. This is all about utilization of manpower to its fullest means ensuring that all skills available in all people involved are tapped to their fullest potential.

6. Ensuring efficiency by reducing redundancy of tasks:

This basically means eliminating unnecessary steps, or reworking any given process or procedure to ensure that the minimal amount of work and time is being consumed. This must be maintained while also ensuring that the above criteria of maximum utilization of manpower, minimum resource consumption, proper standards of quality and maximum expediency are met. Leadership, again, is directly involved in this, no matter the role nor department.

PRODUCTION AND OTHER FUNCTIONAL AREAS

An organization is considered as a system having several sub-systems. Marketing sub-system has to make available the products to the consumers for their consumption. It receives sales orders, which are communicated to the production sub-system. Production utilizes raw materials, which are processed on plant and machinery to turn out a value-added finished product. In other words, an organization utilizes the available facilities to satisfy the market. While manufacturing products, the production function organizes its resources in accordance with the production plan. The finance function makes available finance necessary to carry out their functions to all other departments. Personnel function is a support function which plans and provides manpower to all other sub-systems. It formulates suitable personnel policies. All business sub-systems are inter-linked and inter-dependent. Marketing may fail, if the production does not fulfill the expectations of customers by providing suitably manufactured products. Production may fail in the absence of the working capital necessary to buy raw material for turning out the product. If skilled manpower is not available all other plans will come to a naught. The co-ordination amongst the various sub-systems is necessary for effective functioning of any organization.

Interface of Production and other Functions

- Accountants have to understand the basic inventory management and capacity utilization.
- Management Accountants must know process costing and variance analysis.
- Financial Managers take capital budgeting decision, based on production requirements. Cash flow statements and current asset management has to be examined in the light of production decisions. Make-or-buy or plant expansion has financial implications.
- Marketing Managers have to understand production schedules to meet their delivery requirements. They should understand ho-w products can be customized. Production has a great role to play in new product development. In service industries, marketing and operation overlap each other.
- Personnel department is interested in understanding job analysis, job descriptions, job specifications and job evaluation. They develop compensation plans and incentive system, keeping production requirements in mind.

- MIS has to install suitable control systems for production control which takes inputs from marketing information system and provides output to purchasing information system.
- Entrepreneurs owe their success to successful production planning supported by working capital management and inventory management.

PLANT LOCATION

Plant location refers to the choice of region and the selection of a particular site for setting up a business or factory. But the choice is made only after considering cost and benefits of different alternative sites. It is a strategic decision that cannot be changed once taken. If at all changed only at considerable loss, the location should be selected as per its own requirements and circumstances. Each individual plant is a case in itself. Businessman should try to make an attempt for optimum or ideal location.

FACTORS AFFECTING PLANT LOCATION

1. Availability of raw materials:

Availability of raw materials is the most important factor in plant location decisions. Usually, manufacturing units where there is the conversion of raw materials into finished goods is the main task then such organizations should be located in a place where the raw materials availability is maximum and cheap.

2. Nearness to the market:

Nearness of market for the finished goods not only reduces the transportation costs, but it can render quick services to the customers. If the plant is located far away from the markets then the chances of spoiling and breakage become high during transport. If the industry is nearer to the market then it can grasp the market share by offering quick services.

3. Availability of labor:

Another most important factor which influences the plant location decisions is the availability of labor. The combination of the adequate number of labor with suitable skills and reasonable labor wages can highly benefit the firm. However, labor-intensive firms should select the plant location which is nearer to the source of manpower.

4. Transport facilities:

In order to bring the raw materials to the firm or to carrying the finished goods to the market, transport facilities are very important. Depending on the size of the finished goods or raw materials a suitable transportation is necessary such as roads, water, rail, and air. The transportation costs must be kept low.

5. Availability of fuel and power:

Unavailability of fuel and power is the major drawback in selecting a location for firms. Fuel and power are necessary for all most all the manufacturing units, so locating firms nearer to the coal beds and power industries can highly reduce the wastage of efforts, money and time due to the unavailability of fuel and power.

6. Availability of water:

Depending on the nature of the plant firms should give importance to the locations where water is available. For example, power plants where use water to produce power should be located near the water bodies.

Secondary factors

1. Suitability of climate
2. Government policies
3. Availability of finance
4. Competition between states
5. Availability of facilities
6. Disposal of waste

PLANT LAYOUT

According to Riggs, "the overall objective of plant layout is to design a physical arrangement that most economically meets the required output – quantity and quality."

OBJECTIVES OF PLANT LAYOUT

Plant layout is an important decision as it represents long-term commitment. An ideal plant layout should provide the optimum relationship among output, floor area and manufacturing process. It facilitates the production process, minimizes material handling, time and cost, and allows flexibility of operations, easy production flow, makes economic use of the building, promotes effective utilization of manpower, and provides for employee's convenience, safety, comfort at work, maximum exposure to natural light and ventilation. It is also 99 important because it affects the flow of material and processes, labour efficiency, supervision and control, use of space and expansion possibilities etc.

PRINCIPLES OF PLANT LAYOUT

- Proper and efficient utilization of available floor space
- To ensure that work proceeds from one point to another point without any delay
- Provide enough production capacity.
- Reduce material handling costs
- Reduce hazards to personnel
- Utilize labour efficiently
- Increase employee morale
- Reduce accidents
- Provide for volume and product flexibility
- Provide ease of supervision and control
- Provide for employee safety and health
- Allow ease of maintenance
- Allow high machine or equipment utilization
- Improve productivity

TYPES OF PLANT LAYOUT

1. Product or Line Layout:

If all the processing equipment and machines are arranged according to the sequence of operations of the product, the layout is called product type of layout. In this type of layout, only one product of one type of products is produced in an operating area. This product must be standardized and produced in large quantities in order to justify the product layout.

The raw material is supplied at one end of the line and goes from one operation to the next quite rapidly with a minimum work in process, storage and material handling. Fig. 8.3 shows product layout for two types of products A and B.

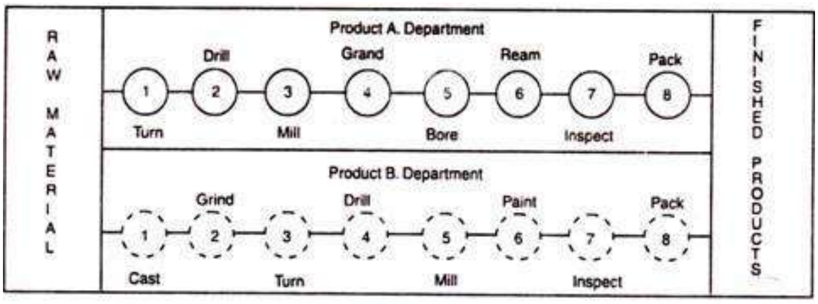


Fig. 8.3.

2. Process or Functional Layout:

The process layout is particularly useful where low volume of production is needed. If the products are not standardized, the process layout is lower desirable, because it has creator process flexibility than other. In this type of layout, the machines and not arranged according to the sequence of operations but are arranged according to the nature or type of the operations. This layout is commonly suitable for non repetitive jobs.

3. Fixed Position Layout:

This type of layout is the least important for today's manufacturing industries. In this type of layout the major component remain in a fixed location, other materials, parts, tools, machinery, man power and other supporting equipment's are brought to this location. The major component or body of the product remain in a fixed position because it is too heavy or too big and as such it is economical and convenient to bring the necessary tools and equipment's to work place along with the man power. This type of layout is used in the manufacture of boilers, hydraulic and steam turbines and ships etc.

4. Combination Type of Layout:

Now a day in pure state any one form of layouts discussed above is rarely found. Therefore, generally the layouts used in industries are the compromise of the above mentioned layouts. Every layout has got certain advantages and limitations. Therefore, industries would to like use any type of layout as such. Flexibility is a very important factory, so layout should be such which can be molded according to the requirements of industry, without much investment. If the good features of all types of layouts are connected, a compromise solution can be obtained which will be more economical and flexible.

Advantages: Process layout provides the following benefits

a) Lower initial capital investment in machines and equipments. There is high degree of machine utilization, as a machine is not blocked for a single product

b) The overhead costs are relatively low

c) Change in output design and volume can be more easily adapted to the output of variety of products

d) Breakdown of one machine does not result in complete work stoppage

e) Supervision can be more effective and specialized

f) There is a greater flexibility of scope for expansion.

Disadvantages: Product layout suffers from following drawbacks

a. Material handling costs are high due to backtracking

b. More skilled labour is required resulting in higher cost.

c. Time gap or lag in production is higher

d. Work in progress inventory is high needing greater storage space

e. More frequent inspection is needed which results in costly supervision

Suitability: Process layout is adopted when

1. Products are not standardized
2. Quantity produced is small
3. There are frequent changes in design and style of product
4. Job shop type of work is done
5. Machines are very expensive

UNIT II

Meaning of Work Study:

According to ILO — International Labour Organisation — work study is "a term used to embrace the techniques of method study and work measurement which are employed to ensure the best possible use of human and material resources in carrying out a specified activity." In other words, "work study is a tool or technique of management involving the analytical study of a job or operation." Work study helps to increase productivity.

ADVANTAGES OF WORKSTUDY

- Work study ensures higher productivity,
- Better working conditions with less fatigue,
- Higher wages to workers,
- Uniform production flow,
- Job satisfaction and job security to workers,
- Reduction in unit cost of production,
- Quality products to consumers,
- Fast delivery schedule,
- Harmonious employer-employee relation, and
- Better service to customers.

METHOD STUDY

Method study is the process of subjecting work to systematic, critical scrutiny to make it more effective and efficient.

OBJECTIVES OF METHOD STUDY

- The improvement of processes and procedures.
- Factory and work place layout improvement.
- Improvement in the design of plant and equipment.
- Reduction in unnecessary fatigue and movements.
- Use of improved materials, machines and manpower.
- Better Working conditions.

WORK MEASUREMENT

Work measurement has been defined by British Standard Institution as, “The application of techniques designed to establish the time for a qualified worker to carry out a specified job at a defined level of performance”**.** This time is called standard or allowed time.

1. To compare the times of performance by alternative methods.
2. To enable realistic schedule of work to be prepared.
3. To arrive at a realistic and fair incentive scheme.
4. To analyze the activities for doing a job with the view to reduce or eliminate unnecessary jobs.
5. To minimize the human effort.
6. To assist in the organisation of labour by daily comparing the actual time with that of target time.

MEANING OF TIME AND MOTION STUDY:

Time study is defined as a work measurement technique for recording the times and rates of working for the elements of a specified job carried out under specified conditions and for analysing the data to determine the time necessary for carrying out the job at a defined level of performance.

Motion study implies dividing the work into fundamental elements or basic operations of a job or a process with the object of eliminating unnecessary or defective elements in a job. After investigating all movements in a job, process or operation it finds out the most scientific and systematic method of performing the operation or completing the job.

MAINTANANCE

Maintenance management is defined as the process of maintaining the assets and resources of a company, which has as main objective to control and reduce costs, times, and resources. It goes through the regular monitoring of the functioning of machines, equipment, facilities, and tools. This management avoids, for example, production stoppages due to broken equipment and waste of resources in inefficient maintenance processes.

TYPES OF MAINTENANCE MANAGEMENT

1. Breakdown(Reactive)Maintenance

Breakdown maintenance is basically the ‘run it till it breaks’ maintenance mode. No actions or efforts are taken to maintain the equipment as the designer originally intended to ensure design life is reached. Studies as recent indicate that, this is still the predominant mode of maintenance. Advantages to breakdown maintenance can be viewed as a double-edged sword. If we are dealing with new equipment, we can expect minimal incidents of failure. If our maintenance program is purely reactive, we will not expend manpower or incur capital cost until something breaks. Since we do not see any associated maintenance cost, we could view this period as saving money.

Advantages

1. Involves low cost investment for maintenance.
2. Less staff is required.

Disadvantages

1. Increased cost due to unplanned downtime of equipment.
2. Increased labor cost, especially if overtime is needed.
3. Cost involved with repair or replacement of equipment.
4. Possible secondary equipment or process damage from equipment failure.
5. Inefficient use of staff resources.

2. **Preventive-Maintenance**

Preventive maintenance can be defined as, "Actions performed on a time or machine-run-based schedule that detect, preclude, or mitigate degradation of a component or system with the aim of sustaining or extending its useful life through controlling degradation to an acceptable level."

Advantages

1. Cost effective in many capital intensive processes.
2. Flexibility allows for the adjustment of maintenance periodicity.
3. Increased component life cycle.
4. Energy savings.
5. Reduced equipment or process failure.
6. Estimated 12% to 18% cost savings over reactive maintenance program.

Disadvantages

1. Catastrophic failures still likely to occur.
2. Labor intensive.
3. Includes performance of unneeded maintenance.

4. Potential for incidental damage to components in conducting unneeded maintenance.

3. Predictive-Maintenance

Predictive maintenance can be defined as "Measurements that detect the onset of a degradation mechanism, thereby allowing causal stressors to be eliminated or controlled prior to any significant deterioration in the component physical state. Results indicate current and future functional capability".

Advantages

a) Increased component operational life/ availability.
b) Allows for pre-emptive corrective actions.
c) Decrease in equipment or process downtime.
d) Decrease in costs for parts and labor.
e) Better product quality.
f) Improved worker and environmental safety.
g) Improved worker moral.
h) Energy savings.
i) Estimated 8% to 12% cost savings over preventive maintenance program.

Disadvantages

a) Increased investment in diagnostic equipment.
b) Increased investment in staff training.
c) Savings potential not readily seen by management.

4. Concept of Reliability in Maintenance Reliability is the probability of survival under a given operating environment. For example, the time between consecutive failures of a refrigerator where continuous working is required is a measure of its reliability. If this time is more, the product is said to have high reliability.

UNIT III

NEED FOR PRODUCTION PLANNING AND CONTROL

- **Customer Service Enhancement** - The production planning component of PPC ensures that the organization can deliver a finished product on time. Customers can benefit from having high-quality products being delivered promptly due to improved scheduling and optimized production. These improvements ultimately win customers over and can persuade them to establish a profitable and ongoing relationship with the manufacturing organization.
- **Inventory Control** - Proper inventory management can be a challenging thing to achieve as planners must balance holding enough inventory to satisfy customer demand while minimizing the risks and costs of holding too much inventory. With a promising production planning and control system, inventory planning becomes much easier. These types of systems allow planners to only purchase enough materials to fulfill orders which reduces the need for holding a lot of raw materials. In addition, they can provide the tools for utilizing a Just-In-Time scheduling strategy, which further reduces the need for holding finished goods or large quantities of work-in-process items.
- **Equipment Improvement** - Production planning and control will ultimately unveil areas and machines that are not able to meet their production targets. These could signal a lack of productivity due to faulty equipment which can be remedied by scheduling regular maintenance and cleaning for the underperforming resources. This will enable you to have equipment that is able to meet the targeted production outputs and ensure that the resources are being used efficiently. In addition, the capacity planning aspect of production planning and scheduling will ensure that all resources are being utilized to their full potential.
- **Plant Morale Improvement** - Stress can be a tremendous hindrance in manufacturing as it increases the likelihood of errors and defects on the shop floor. A production planning and control system that ensures a systematic workflow through the production flow allows planners to better quote lead times. The overall outcome is that activities are properly coordinated

and there is no need to rush orders to meet deadlines. The shop floor personnel are then able to know what needs to be done and are able to meet their production goals without the stress of rushing orders due to a disorganized plan.

- **Idle Time Reduction** - In manufacturing production, idle time refers to the paid time where an employee or machine is unproductive. Idle time is usually due to workers waiting for materials to begin production or on various machine repairs. These periods of low productivity can be costly for manufacturers. However, production planning and control is a viable solution to minimize downtime as it can effectively coordinate the purchasing and release of materials to ensure that every production step can start when scheduled.
- **Quality Improvement** - High-quality products must be able to meet industry standards at various checkpoints in the manufacturing process. As production planning and control overlook all aspects of production from materials planning to resource optimization, this ensures that the quality of the finished goods is maintained. Having quality products is critical nowadays to ensure the satisfaction of customers. Your customers will be more likely to choose and endorse your brand if they know that your products are consistently reliable and durable.

FUNCTIONS OF PRODUCTION PLANNING AND CONTROL

1. Utilizes resources effectively

a) Production planning and control result in effective utilization of plant capacity, equipment and resources.

b) It results in low-cost and high-returns for the organization.

2. Makes flow of production steady

a) Production planning and control ensure a regular and steady flow of production.

b) All machines are put to their optimum use.

c) This helps in achieving a continuous production of goods.

d) This also helps to provide a regular supply of goods to consumers.

3. Estimates production resources

a) reduction planning and control help to estimate the resources like men, materials, machines, etc.

b) The estimate is made based on sales forecast.

c) So, production is planned to meet sales requirements.

4. Maintains necessary stock levels

a) Production planning and control prevent over-stocking and under-stocking of materials.

b) Necessary stocks are maintained.

c) Stock of raw-material is maintained at a proper level in order to meet production demands.

d) Stock of finished goods is also maintained to meet regular demands from customers.

5. Coordinates departmental activities

a) Production planning and control helps to co-ordinate the activities of different departments.

b) Consider, for an example, the marketing department co-ordinates with production department to sell the goods.

c) This results in profit to the organization.

6. Minimizes wastage of resources

a) Production planning and control ensure proper inventory of raw-materials and effective handling of materials.

b) This helps to minimize the wastage of raw materials.

c) It also ensures production of quality goods. This results in minimal rejects.

d) So, it results in minimum wastage.

7. Improves labor efficiency

a) There is maximum utilization of manpower.

b) Training is provided to the workers.

c) The profits are shared with the workers in form of increased wages and other incentives.

d) Workers are motivated to perform their best. This results in improved labor efficiency.

8. Helps to face competition

a) Production planning and control help to give delivery of goods to customers in time.

b) This is because of regular flow of quality production.

c) So, the company can face competition effectively, and it can capture the market.

9. Provides better work environment

a) Production planning and control provide a better work environment to workers.

b) They get better work facilities, proper working hours, leave and holidays, increased wages and other incentives.

10. Facilitates quality improvement

c) Production planning and control facilitate quality improvement because the production is checked regularly.

d) Quality consciousness is developed among the employees through training, suggestion schemes, quality circles, etc.

11. Customer satisfaction

e) Production planning and control help to give a regular supply of goods and services to consumers at competitive market price.

a) This results in customer satisfaction.

12. Reduces production costs

f) Production planning and control make optimum utilization of resources, and it minimizes wastage.

a) It also maintains an optimal level of inventories.

b) Overall, this reduces the production costs.

ROUTING

The routing is a vital portion of production control and production management. It lays down the flow of work in the plant. It determines how and where the work is to be done, what machines are to be used and it prescribes the path and sequence of operations to be followed. This provides a basis for scheduling, dispatching and control functions.

SCHEDULING

The scheduling may be called as the time phase of loading. The loading means the assignment of work to a facility (man, machine, group of men, group of machines) where as scheduling includes, in addition, the specifications of time and sequence in which the work is to be done.

DISPATCHING

The dispatching is the most important activity of the production, planning and control. It is defined as the physical release of work authorization to a operating facility (men, machine) in accordance with a previously established plan developed by routing and scheduling functions.

INSPECTION

Inspection is an important tool to achieve quality concept. It is necessary to assure confidence to manufacturer and aims satisfaction to customer. Inspection is an indispensable tool of modern manufacturing process. It helps to control quality, reduces manufacturing costs, eliminate scrap losses and assignable causes of defective work.

OBJECTIVES

1. To detect and remove the faulty raw materials before it undergoes production.
2. To detect the faulty products in production whenever it is detected.
3. To bring facts to the notice of managers before they become serous to enable them discover weaknesses and over the problem.
4. To prevent the substandard reaching the customer and reducing complaints.
5. To promote reputation for quality and reliability of product.

CAPACITY PLANNING

A capacity planning process involves determining how much production capacity is required to meet changing demand for products. Design capacity refers to an organization's maximum capacity to accomplish work over a given time period in capacity planning.

IMPORTANCE OF CAPACITY PLANNING

#1. Minimizing resource costs

It is the process of capacity planning that helps an organization to meet the future resource needs effectively. It lets you see the workings of every individual so that the company can make viable changes to future assignments based on the availability and skills of the team.

#2. Information –

A capacity planning method helps to accumulate digital information on a regular basis that will prove beneficial in the growth of the company.

#3. Monitoring costs –

An organization can easily monitor costs during recession and growths with the help of capacity planning as it takes into account supplies and schedules of production, facilities, and personnel.

#4. Ensures availability –

The capacity planning report shows you whether you have the scope to accept new projects. Do you need to outsource or are your resources enough is an important question that is easily answered via this method?

#5. Production cycles –

An organization uses the process of capacity planning to maintain the necessary production cycle so that it does not have to stay behind during high demands.

#6. Managing skills inventory

Capacity planning is linked with the skills inventory of a team, and it informs which member has the necessary skills for a particular job. It becomes easy to allocate resources as per needed.

MEASUREMENT OF CAPACITY PLANNING

The capacity of the manufacturing unit can be expressed in number of units of output per period. In some situations measuring capacity is more complicated when they manufacture multiple products. In such situations, the capacity is expressed as man-hours or machine hours.

CAPACITY PLANNING PROCESS

- **Understand current capacity.** What projects, using what people do we currently have under management? What extra time do people have to do more work?

- **Project future demand.** What projects are in our sales pipeline, how certain are they to close and when will they start. What skills will be required for those projects?
- **Identify where additional capacity could come from.** Can we work extra hours, develop new skills? Should we hire more people?
- **Assess your risks.** Will people burn out if we load in more work? What happens if we don't meet demand? Calculate and quantify the risk of lower customer satisfaction if a project can't start on time, or the cost of hiring and retraining employees if people quit. And don't forget the lost opportunity costs associated with not having capacity to sell your services when demand is high.

UNIT IV

MATERIAL MANAGEMENT

L.J. De Rose: "Material management is the planning, directing, controlling and co-ordination of all those activities concerned with material and inventory requirements, from the point of their inception to their introduction into manufacturing process."

IMPORTANCE

1. The material cost content of total cost is kept at a reasonable level. Scientific purchasing helps in acquiring materials at reasonable prices. Proper storing of materials also helps in reducing their wastages. These factors help in controlling cost content of products.
2. The cost of indirect materials is kept under check. Sometimes cost of indirect materials also increases total cost of production because there is no proper control over such materials.
3. The equipment is properly utilized because there are no break downs due to late supply of materials.
4. The loss of direct labour is avoided.
5. The wastages of materials at the stage of storage as well as their movement is kept under control.
6. The supply of materials is prompt and late delivery instances are only few.
7. The investments on materials are kept under control as under and over stocking is avoided.
8. Congestion in the stores and at different stages of manufacturing is avoided.

FUNCTIONS OF MATERIAL MANAGEMENT

1. Production and Material Control:

Production manager prepares schedules of production to be carried in future. The requirements of parts and materials are determined as per production schedules. Production schedules are prepared on the basis of orders received or anticipated demand for goods. It is ensured that every type or part of material is made available so that production is carried on smoothly.

2. Purchasing:

Purchasing department is authorized to make buying arrangements on the basis of requisitions issued by other departments. This department keeps contracts with suppliers and collects quotations etc. at regular intervals. The effort by this department is to purchase proper quality goods at reasonable prices. Purchasing is a managerial activity that goes beyond the simple act of buying and includes the planning and policy activities covering a wide range of related and complementary activities.

3. Non-Production Stores:

Non-production materials like office supplies, perishable tools and maintenance, repair and operating supplies are maintained as per the needs of the business. These stores may not be required daily but their availability in stores is essential. The non-availability of such stores may lead to stoppage of work.

4. Transportation:

The transporting of materials from suppliers is an important function of materials management. The traffic department is responsible for arranging transportation service. The vehicles may be purchased for the business or these may be chartered from outside. It all depends upon the quantity and frequency of buying materials. The purpose is to arrange cheap and quick transport facilities for incoming materials.

5. Materials Handling:

It is concerned with the movement of materials within a manufacturing establishment and the cost of handling materials is kept under control. It is also seen that there are no wastages or losses of materials during their movement. Special equipment’s may be acquired for material handling.

6. Receiving:

The receiving department is responsible for the unloading of materials, counting the units, determining their quality and sending them to stores etc. The purchasing department is also informed about the receipt of various materials.

MATERIAL REQUIREMENT PLANNING

Material Requirements Planning (MRP) is a standard supply planning system to help businesses, primarily product-based manufacturers, understand inventory requirements while balancing supply and demand. Businesses use MRP systems, which are subsets of supply chain management systems, to efficiently manage inventory, schedule production and deliver the right product—on time and at optimal cost.

MRP Steps and Processes

The MRP process can be broken down into four major steps:

1. **Identifying requirements to meet demand.**

The first step of the MRP process is identifying customer demand and the requirements needed to meet it, which starts with inputting customer orders and sales forecasts.

Using the bill of materials required for production, MRP then disassembles demand into the individual components and raw materials needed to complete the build while accounting for any required sub-assemblies.

2. **Checking inventory and allocating resources.**

Utilizing the MRP to check demand against inventory and allocating resources accordingly, you can see both what items you have in stock and where they are—this is especially important if you have inventory across several locations. This also lets you see the status of items, which gives visibility into items that are already allocated to another build, as well as items not yet physically in the warehouse that are in transit, or on order. The MRP then moves inventory into the proper locations and prompts reorder recommendations.

3. **Scheduling production.**

Using the master production schedule, the system determines how much time and labor are required to complete each step of each build and when they need to happen so that the production can occur without delay.

The production schedule also identifies what machinery and workstations are needed for each step and generates the appropriate work orders, purchase orders and transfer orders. If the build requires subassemblies, the system takes into account how much time each subassembly takes and schedules them accordingly.

4. Identifying issues and making recommendations.

Finally, because the MRP links raw materials to work orders and customer orders, it can automatically alert your team when items are delayed and make recommendations for existing orders: automatically moving production in or out, performing what-if analyses, and generating exception plans to complete the required builds.

CONCEPT OF MRP

1. **Lead Time -** In manufacturing, lead time refers to the time that elapses between the start of production and the completion of a product. Lead time is used during MRP to determine the need date of materials and sub-components when exploding requirements from the bill of materials. Lead time is examined closely within manufacturing and supply chain management as many companies want to reduce the amount of time that it takes to deliver products to the market.
2. **Lumpy Demand -** Lumpy demand signals are synonymous with variations in demand and signify that demand for items can vary substantially from one period to another and can be interspersed with periods where there is no demand at all. MRP plays a large role in dealing with lumpy demand-driven inventory situations which is usually not the case with classical inventory models that assume continuous demand. While this may appear counterintuitive, MRP systems allow manufacturers to better handle items with lumpy signal patterns.
3. **Time Phasing -** In manufacturing, time phasing signifies delaying the release of materials and components until they are needed for production. Typically, the master production schedule looks at demand for items within a certain time period then MRP determines the quantity and timing of each material.

INVENTORY CONTROL

It is the process of managing a company's inventory levels, whether that be in their own warehouse or spread over other locations.

TECHNIQUES OF INVENTORY CONTROL SYSTEM

1. Setting up of various stock levels:

To avoid over-stocking and under stocking of materials, the management has to decide about the maximum level, minimum level, re-order level, danger level and average level of materials to be kept in the store.

(a) Re-ordering level:

It is also known as 'ordering level' or 'ordering point' or 'ordering limit'. It is a point at which order for supply of material should be made.

(b) Maximum Level:

Maximum level is the level above which stock should never reach. It is also known as 'maximum limit' or 'maximum stock'. The function of maximum level is essential to avoid unnecessary blocking up of capital in inventories, losses on account of deterioration and obsolescence of materials, extra overheads and temptation to thefts etc. This level can be determined with the following formula. Maximum Stock level = Reordering level + Reordering quantity —(Minimum Consumption x Minimum re-ordering period)

(c) Minimum Level:

It represents the lowest quantity of a particular material below which stock should not be allowed to fall. This level must be maintained at every time so that production is not held up due to shortage of any material.

(d) Average Stock Level:

Average stock level is determined by averaging the minimum and maximum level of stock.

(e) Danger Level:

Danger level is that level below which the stock should under no circumstances be allowed to fall. Danger level is slightly below the minimum level and therefore the purchases manager should make special efforts to acquire required materials and stores.

(f) Economic Order Quantity (E.O.Q.):

One of the most important problems faced by the purchasing department is how much to order at a time. Purchasing in large quantities involve lesser purchasing cost. But cost of carrying them tends to be higher. Likewise if purchases are made in smaller quantities, holding costs are lower while purchasing costs tend to be higher.

2. Preparation of Inventory Budgets:

Organisations having huge material requirement normally prepare purchase budgets. The purchase budget should be prepared well in advance. The budget for production and consumable material and for capital and maintenance material should be separately prepared.

3. Maintaining Perpetual Inventory System:

This is another technique to exercise control over inventory. It is also known as automatic inventory system. The basic objective of this system is to make available details about the quantity and value of stock of each item at all times. Thus, this system provides a rigid control over stock of materials as physical stock can be regularly verified with the stock records kept in the stores and the cost office.

4. Establishing Proper Purchase Procedures:

(a) Purchase Requisition:

It is the requisition made by the various departmental heads or storekeeper for their various material requirements. The initiation of purchase begins with the receipts of a purchase requisition by the purchase department.

(b) Inviting Quotations:

The purchase department will invite quotations for supply of goods on the receipt of purchase requisition.

(c) Schedule of Quotations:

The schedule of quotations will be prepared by the purchase department on the basis of quotations received.

(d) Approving the supplier:

The schedule of quotations is put before the purchase committee who selects the supplier by considering factors like price, quality of materials, terms of payment, delivery schedule etc.

(e) Purchase Order:

It is the last step and the purchase order is prepared by the purchase department. It is a written authorisation to the supplier to supply a specified quality and quantity of material at the specified time and place mentioned at the stipulated terms.

5. Inventory Turnover Ratio:

Inventory Turnover Ratio = Cost of goods consumed/sold during the period/Average inventory held during the period

The ratio indicates how quickly the inventory is used for production. Higher the ratio, shorter will be the duration of inventory at the factory. It is the index of efficiency of material management.

(a) Slow moving Inventories:

These inventories have a very low turnover ratio. Management should take all possible steps to keep such inventories at the lowest levels.

(b) Dormant Inventories:

These inventories have no demand. The finance manager has to take a decision whether such inventories should be retained or scrapped based upon the current market price, conditions etc.

(c) Obsolete Inventories:

These inventories are no longer in demand due to their becoming out of demand. Such inventories should be immediately scrapped.

(d) Fast moving inventories:

These inventories are in hot demand. Proper and special care should be taken in respect of these inventories so that the manufacturing process does not suffer due to shortage of such inventories.

OBJECTIVES OF INVENTORY CONTROL

Ensure stock availability

Having the right inventory levels is only a part of the problem to ensure smooth flow of goods in warehouses. For a manufacturing company, there are bottlenecks caused by disorganized warehouse structures or related items being placed too far away. Inventory control’s objective here is to ensure a steady supply of raw materials and subassemblies (manufactured or outsourced) from the warehouses without interruptions for fulfilling manufacturing orders on time. This also applies to distribution businesses where inventory has to be picked and packed for shipping orders.

Prevent wastage

Inventory waste happens in two cases—either the stock is defective or the stock has expired. It also happens when stock is idle and there’s no market demand. Here, inventory control aims to prevent defective stock from entering your warehouses with quality control, and to prevent dead stock or accumulation of expired items.

Maximize profitability

Poor inventory control impacts profits negatively. This is not surprising once you realize that one of the other objectives is avoiding stock wastage. Not only that, but poor inventory control also means difficulty in picking items from warehouses where required, be it manufacturing orders or distribution activities. If the orders are not fulfilled on time, customers won't be happy. Hence, good inventory control positively impacts revenue in two ways—by avoiding money lost in expired stock and eliminating any inefficiencies during stock movements between storage areas.

Save storage space

Stocking inventory requires physical space. Actively managing your inventory, warehouse layouts, locations, saves on warehouse space and hence rent costs. It also involves doing away with excess stock, dead stock, and expired stock. If your storage areas are planned well and aren't occupied by dead stock, you'll be saving on storage space for the products that sell better.

TOOLS OF INVENTORY MANAGEMENT

1. **Barcode data collection**

The perpetual inventory system is highly dependent on timely and accurate reporting.

Manual reporting can be plagued by delays, errors, missing transactions, and undue burden on the workforce to collect and enter the data. Automated data collection, most often through barcode scans, removes much of the reporting burden, while greatly improving accuracy and timeliness of transactions.

2. **Cycle counting to improve accuracy**

Inventory accuracy is very important to the effective planning and control of inventory. Sadly, most inventory tracking systems are woefully inaccurate without an active and disciplined cycle counting system in place. Cycle counting replaces the cumbersome and error-prone periodic (usually annual) physical inventory count with a regular program of counting selected items so that more important items are counted more often that less important ones. The magic of cycle counting is that it provides a structure for identifying and eliminating the source of errors to improve accuracy in a sustainable way.

3. **ABC analysis for prioritisation**

Cycle counting is usually set up using ABC analysis to identify the more important and less important items mentioned above. The most common ABC analysis (also called Pareto analysis) method is to rank all inventory items according to the total value of each on an annual basis (annual "usage" or movement times unit cost). Typically, the top 20 percent of items represent 80 percent of the annual value through the warehouse (80/20 rule). The next 30 percent (B items) account for 15 percent of the value and the remaining 50 percent, the C items, total five percent of annual value.

In addition to setting cycle counting frequency, ABC classifications should drive item location in the warehouse, lot sizing and safety stock rules, and other management parameters to put your focus on the items that matter, where you can get the most return for your investment.

4. **Integrated planning and execution**

The primary focus of ERP is to improve customer service (meeting demand) while optimising resources including inventory (and reducing costs). While the inventory system provides critical information for the planning and execution systems within ERP, these functions return the favour by managing the use and replenishment of inventory to minimise shortages and lowering the overall inventory investment.

5. **Lot tracking and traceability**

Not every company needs serial number or lot tracking traceability, but more and more are collecting this information in recognition of the increasing risk of product recalls.

6. **VED Analysis:**

VED stands for vital, essential and desirable. This analysis relates to the classification of maintenance spare parts and denotes the essentiality of stocking spares.

The spares are split into three categories in order of importance. From the view-points of functional utility, the effects of non-availability at the time of requirement or the operation, process, production, plant or equipment and the urgency of replacement in case of breakdown.

7. **FSN Analysis:**

Here the items are classified into fast-moving (F), slow-moving (S) and Non-moving (N) items on the basis of quantity and rate of consumption. The non-moving items (usually, not consumed over a period of two years) are of great importance. It is found that many companies maintain huge stocks of non-moving items blocking quite a lot of capital.

EOQ REORDER POINT

The EOQ reorder point is a contraction of the term economic order quantity reorder point. It is a formula used to derive that number of units of inventory to order that represents the lowest possible total cost to the ordering entity.

Example of the EOQ Reorder Point ABC International uses 100,000 pounds of aluminum ingots per year, and the cost to place each order is $15. The carrying cost for one pound of aluminum ingots is $5 per year. The EOQ reorder point, based on this information, is the square root of:

(2 x 100,000 x $15) ÷ $5

= EOQ reorder point of 775 units

Safety Stock and Reorder Point

Safety stock describes the amount of inventory a business keeps in the warehouse to protect against spikes in demand or shortages in supply. From a perspective of a manufacturer, safety stock principles can and should be applied for both raw materials and final products to ensure availability of input for production, and goods for delivery. Most manufacturers employ some kind of minimum inventory principles.

How to calculate safety stock level?

The calculation is relatively easy in case you have reliable purchase and sales order history available.

Safety Stock = (Maximum Daily Usage x Maximum Lead Time Days) — (Average Daily Usage x Average Lead Time Days)

JIT AGGREGATE PLANNING

Aggregate planning is a business strategy that helps companies plan how to use their resources and produce what people want in the future.

STRATEGIES

Level strategy

This is also known as a production-smoothing plan or a stable plan. It focuses on maintaining consistent production and human resources in a company. The expected demand rate is achieved by varying the associated factors such as finance and human resources. Though this strategy helps maintain human resources, it also stocks inventory. There are also chances of not meeting the expected targets, resulting in backlogs costing a lot more to the firm.

Chase strategy

It is also known as a just-in-time production plan. Just in time (JIT) is a manufacturing methodology designed to decrease waste by receiving goods only as needed. JIT was developed in Japan to make the best use of limited resources. It focuses on matching the anticipated demand with rigorous production. Unfortunately, though this strategy aims to meet the market, it usually results in stressed employees, which increases attrition.

Hybrid strategy

A hybrid strategy in aggregate planning uses a combination of methods to arrive at the final production plan.

For example, a company may use a mathematical model to calculate the optimal production plan and then adjust it based on their actual production process feedback. The combination gives them the best of both worlds – the accuracy of a level strategy combined with the flexibility of a chase strategy.

UNIT V

QUALITY CONTROL

Quality does not have a singular definition. Despite the relative meaning of "value," quality control is the process by which products/services are tested and measured to ensure they meet a standard. Through this process, a business can evaluate, maintain, and improve product quality.

NEED FOR QUALITY CONTROL

1) **Encourages quality consciousness:**

The most important advantage derived by introducing quality control is that it develops and encourages quality consciousness among the workers in the factory which is greatly helpful in achieving desired level of quality in the product.

2) **Satisfaction of consumers:**

Consumers are greatly benefited as they get better quality products on account of quality control. It gives them satisfaction.

3) **Reduction in production cost:**

By undertaking effective inspection and control over production processes and operations, production costs are considerably reduced. Quality control further checks the production of inferior products and wastages thereby bringing down the cost of production considerably.

4) **Most effective utilisation of resources:**

Quality control ensures maximum utilisation of available resources thereby minimising wastage and inefficiency of every kind.

5) Reduction in inspection costs:

Quality control brings about economies in inspection and considerably reduces cost of inspection.

6) Increased goodwill:

By producing better quality products and satisfying customer's needs, quality control raises the goodwill of the concern in the minds of people. A reputed concern can easily raise finances from the market.

7) Higher morale of employees:

An effective system of quality control is greatly helpful in increasing the morale of employees, and they feel that they are working in the concern producing better and higher quality products.

8) Improved employer-employee relations:

Quality control develops to better industrial atmosphere by increasing morale of employees which ensures cordial employer-employee relations leading to better understanding and closeness between them.

9) Improved techniques and methods of production:

By supplying technical and engineering data for the product and manufacturing processes, improved methods and designs of production are ensured by quality control.

10) Effective advertisement:

Organisations producing quality products have effective advertisement. They win the public confidence by supplying those better quality products.

11) Facilitates price fixation:

By introducing quality control measures, uniform products of same quality are produced. This greatly facilitates the problem of price fixation. One price of standard products becomes prevalent in the market.

12) Increased sales:

Quality control ensures production of quality products which is immensely helpful in attracting more customers for the product thereby increasing sales. It is greatly helpful in maintaining existing demand and creating new demand for the product. It has been rightly pointed out that quality control is a powerful instrument with the help of which markets both at home and abroad can be expanded.

OBJECTIVES OF QUALITY CONTROL

- To establish the desired quality standards which are acceptable to the customers
- To discover flaws or variations in the raw materials and the manufacturing processes in order to ensure smooth and uninterrupted production.
- To evaluate the methods and processes of production and suggest further improvements in their functioning.
- To study and determine the extent of quality deviation in a product during the manufacturing process.
- To analyse in detail the causes responsible for such deviation.
- To undertake such steps which are helpful in achieving the desired quality of the product.

INSPECTION

Inspection is an important tool to achieve quality concept. It is necessary to assure confidence to manufacturer and aims satisfaction to customer. Inspection is an indispensable tool of modern manufacturing process. It helps to control quality, reduces manufacturing costs, eliminate scrap losses and assignable causes of defective work.

TYPES OF INSPECTION

FLOOR-INSPECTION

In this system, the inspection is performed at the place of production. It suggests the checking of materials in process at the machine or in the production time by patrolling inspectors. These inspectors move from machine to machine and from one to the other work centers. Inspectors have to be highly skilled. This method of inspection minimize the material handling, does not disrupt the line layout of machinery and quickly locate the defect and readily offers field and correction.

Advantages

- Detection of errors of the source reduces scrap and rework.
- Correction is done before it affects further production, resulting in saving cost of unnecessary work on defective parts.
- Material handling time is reduced.

- Job satisfaction to worker as he can't be held responsible for bad work at a later date.
- Greater number of pieces can be checked than a sample size.
- Does not delay in production.

Disadvantages

- Delicate instruments can be employed.
- Measuring or inspection equipment have to be recalibrated often as they are subjected to wear or dust.
- High cost of inspection because of numerous sets of inspections and skilled inspectors.
- Supervision of inspectors is difficult due to vibration.
- Pressure on inspector.
- Possibility of biased inspection because of worker.

Suitability

- Heavy products are produced.
- Different work centers are integrated in continuous line layout.

CENTRALISED-INSPECTION

Inspection is carried in a central place with all testing equipment; sensitive equipment is housed in air-conditioned area. Samples are brought to the inspection floor for checking. Centralized inspection may locate in one or more places in the manufacturing industry.

Advantages

- ➢ Greater degree of inspection due to sensitive equipment.
- ➢ Less number of inspectors and tools.
- ➢ Equipment needs less frequency of recalibration.
- ➢ Cost of inspection is reduced.
- ➢ Unbiased inspection.
- ➢ Supervision of inspectors made possible.
- ➢ No distraction to the inspector.

Disadvantages

- ➢ Defects of job are not revealed quickly for prevention.

- Greater material handling.
- High cost as products are subjected to production before they are prevented.
- Greater delay in production.
- Inspection of heavy work not possible.
- Production control work is more complicated.
- Greater scrap.

COMBINED-INSPECTION

Combination of two methods whatever may be the method of inspection, whether floor or central. The main objective is to locate and prevent defect which may not repeat itself in subsequent operation to see whether any corrective measure is required and finally to maintain quality economically.

1. FUNCTIONAL-INSPECTION

This system only checks for the main function, the product is expected to perform. Thus an electrical motor can be checked for the specified speed and load characteristics. It does not reveal the variation of individual parts but can assure combined satisfactory performance of all parts put together. Both manufacturers and purchasers can do this, if large number of articles is needed at regular intervals. This is also called assembly inspection.

2. FIRST PIECE OR FIRST-OFF INSPECTIONS

First piece of the shift or lot is inspected. This is particularly used where automatic machines are employed. Any discrepancy from the operator as machine tool can be checked to see that the product is within in control limits. Excepting for need for precautions for tool we are check and disturbance in machine set up, this yields good result if the operator is careful.

3. PILOT-PIECE-INSPECTION

This is done immediately after new design or product is developed. Manufacturer of product is done either on regular shop floor if production is not disturbed. If production is affected to a large extent, the product is manufactured in a pilot plant. This is suitable for mass production and products involving large number of components such as automobiles aero planes etc., and modification are design or manufacturing process is done until satisfactory performance is assured or established.

4. FINAL-INSPECTION

This is also similar to functional or assembly inspection. This inspection is done only after completion of work. This is widely employed in process industries where there are not possible such as, electroplating or anodizing products. This is done in conjunction with incoming material inspection.

METHODS OF INSPECTION

There are two methods of inspection. They are: 100% inspection and sampling inspection.

1. 100%-INSPECTION

this type will involve careful inspection in detail of quality at each strategic point or stage of manufacture where the test is involved is non-destructive and every piece is separately inspected. It requires more number of inspectors and hence it is a costly method. There is no sampling error. This is subjected to inspection error arising out of fatigue, negligence, difficulty of supervision etc. Hence, completer accuracy of influence is seldom attained. It is suitable only when a small number of pieces are there or a very high degree of quality is required. Example: Jet engines, aircraft, medical and scientific equipment.

2. SAMPLING-INSPECTION

In this method randomly selected samples are inspected. Samples taken from different patches of products are representatives. If the sample proves defective, the entire concerned is to be rejected or recovered. Sampling inspection is cheaper and quicker. It requires less number of Inspectors. It is subjected to sampling errors but the magnitude of sampling error can be estimated.

STATICTICAL QUALITY CONTROL

Controlling and improving quality is an important strategy for an organization since the quality provides a competitive advantage to the organization. The organization which delight its customers by improving and controlling quality, can dominate its competitors. Hence the main objective an organization is to achieve quality assurance so that it can not only satisfy its customers but also delight them.

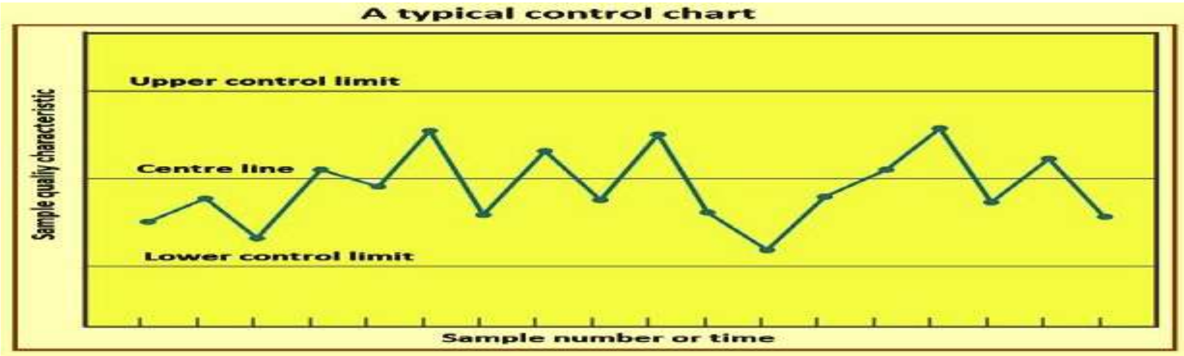
CONTROL CHART

A control chart is a graph which shows whether a sample of data falls within the common or normal range of variation. A control chart has upper control limit (UCL) and lower control limit (LCL) which separate common from assignable causes of variation. The UCL is the maximum acceptable variation from the mean for a process which is in a state of control while the

LCL is the minimum acceptable variation from the mean for a process which is in a state of control. The common range of variation is defined by the use of control chart limits. Control limits are calculated from the process output data and they are not the specification limits. A process is out of control when a plot of data reveals that one or more samples falls outside the preset control limits. Hence by using the control charts, one can know from graphic picture that how the production is proceeding and where corrective action is needed and where it is not needed.

The control chart is a very useful process monitoring technique. When unusual sources of variability are present, sample averages gets plotted outside the control limits. This is a signal that some investigation of the process is to be made and corrective action to remove these unusual sources of variability is to be taken. Systematic use of a control chart is an excellent way to reduce variability.

The general theory of control charts was first proposed by Walter A. Shewhart, and control charts developed according to these principles are frequently called Shewhart control charts. The control chart is a graphical display of a quality characteristic which has been measured or computed from a sample against the sample number or time. The chart contains a centre line which represents the average value of the quality characteristic corresponding to the in-control state.



ACCEPTANCE SAMPLING

Acceptance sampling is a statistical technique used to inspect the quality of a batch of products. This quality control mechanism is applied to samples taken from the product batch. It involves comparing the number of defective pieces and the predefined acceptance number to accept or reject the batch.

THE ROLE OF ACCEPTANCE SAMPLING IS

1. Acceptance Sampling is much less expensive than 100 percent inspection.
2. It is general experience that 100 percent inspection removes only 82 to 95 percent of defective material. Very good 100 percent inspection may remove at the most 99 percent of the defectives, but still cannot reach the level of 100 percent. Due to the effect of inspection fatigue involved in 100 percent inspection, a good sampling plan may actually give better results than that achieved by 100 percent inspection.
3. Because of its economy, it is possible to carry out sample inspection at various stages. Acceptance number is evaluated using sampling plan and confidence level.
4. The 100 percent inspection is not possible, where quality can be tested only by destroying the items. In such case, sampling inspection is the only solution.

TOTAL QALITY MANAGEMENT

Total quality management (TQM) is the continual process of detecting and reducing or eliminating errors in manufacturing, streamlining supply chain management, improving the customer experience, and ensuring that employees are up to speed with training. Total quality management aims to hold all parties involved in the production process accountable for the overall quality of the final product or service.

Zero Defects Approach in Six Sigma

Defects create significant problems that increase the overall costs of products and services the organization produces for its customers. Besides the increased production costs, an organization's human and financial resources costs exceed the estimated budget. Producing and delivering defective products or services that do not meet the quality standards leads to the organization's loss of reputation in the market. Therefore, organizations rely on their effective quality management process to eliminate or minimize defects in the business processes. The concept of zero defects emphasizes the idea that defects should not exist in the first place. Philip B. Crosby originally coined it in his book titled "Quality is Free," which was released in 1979. According to the author, when defects are absent, there are no extra costs related to the management of quality in products and services. Hence, quality becomes free. This article will discuss the zero defects approach and establish whether it is feasible or not.

What is Zero Defect?

Zero Defects is a philosophy in quality management. It is not a methodology that includes the guiding principles or techniques to achieve a zero defects approach in the business. While many quality management professionals and Lean Six Sigma practitioners will argue that the idea of no defects is impossible, specific proportions believe that the phrase should not be taken literally. The zero defects approach is not about accurately predicting and eliminating defects from the business process. It is about being proactive and addressing the problems in the business at the earliest stage.

Zero Defects Approach

Quality managers should treat zero defects as a standard to communicate that the organization strives to create the product or service optimally the first time. It also means no testing and no revisions of products after production since the quality standards have been met since the beginning of the production process. This approach may seem implausible, especially for organizations that support the continuous improvement process of Six Sigma. But the zero defects approach can work simultaneously with the continuous improvement initiative and still meet its objective of no defects.

The goal of producing products and services with no defects is indeed daunting. Primarily, organizations must ensure that all systems, processes, procedures, and employees are proactively working towards the zero defects goal. Therefore, this approach is unsuitable for every quality-related business problem in an organization. The zero defects approach can be applied to business problems that directly impact the organization’s or business enterprise’s objectives. Before adopting this approach, organizations should consider the business requirements and its goals.