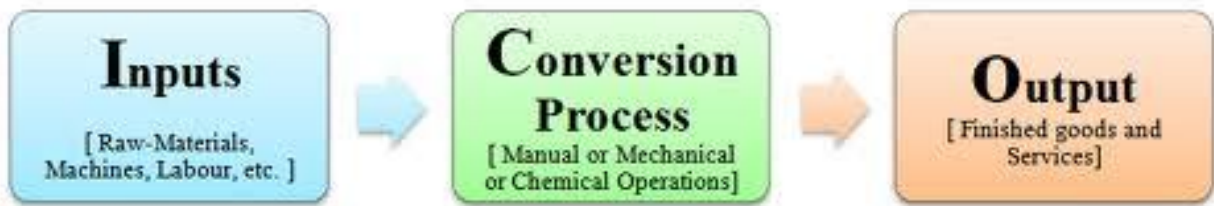


MODULE 3 – PRODUCTION MANAGEMENT

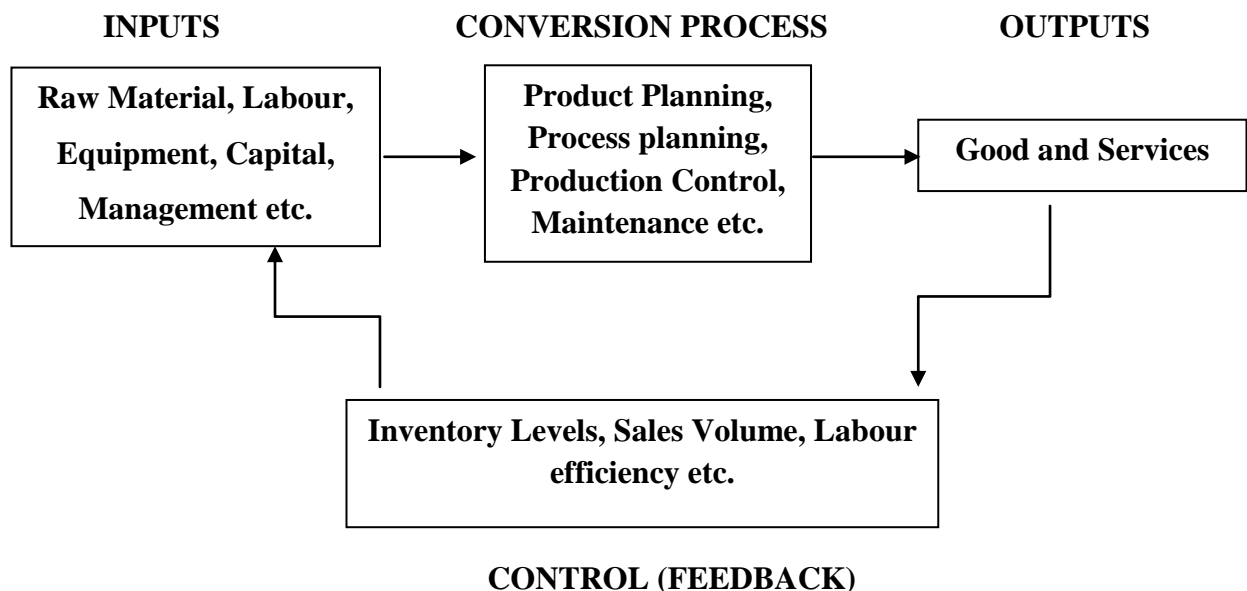
Production:

It is defined as the sequence of technical processes requiring either directly/indirectly the mental and physical skills of craftsmen and consists of changing the shape, size and properties of materials and converting them into useful articles.



Basically, it can be considered as conversion of raw materials to product by the use of equipment's, process and labour(skill).

PRODUCTION SYSTEM



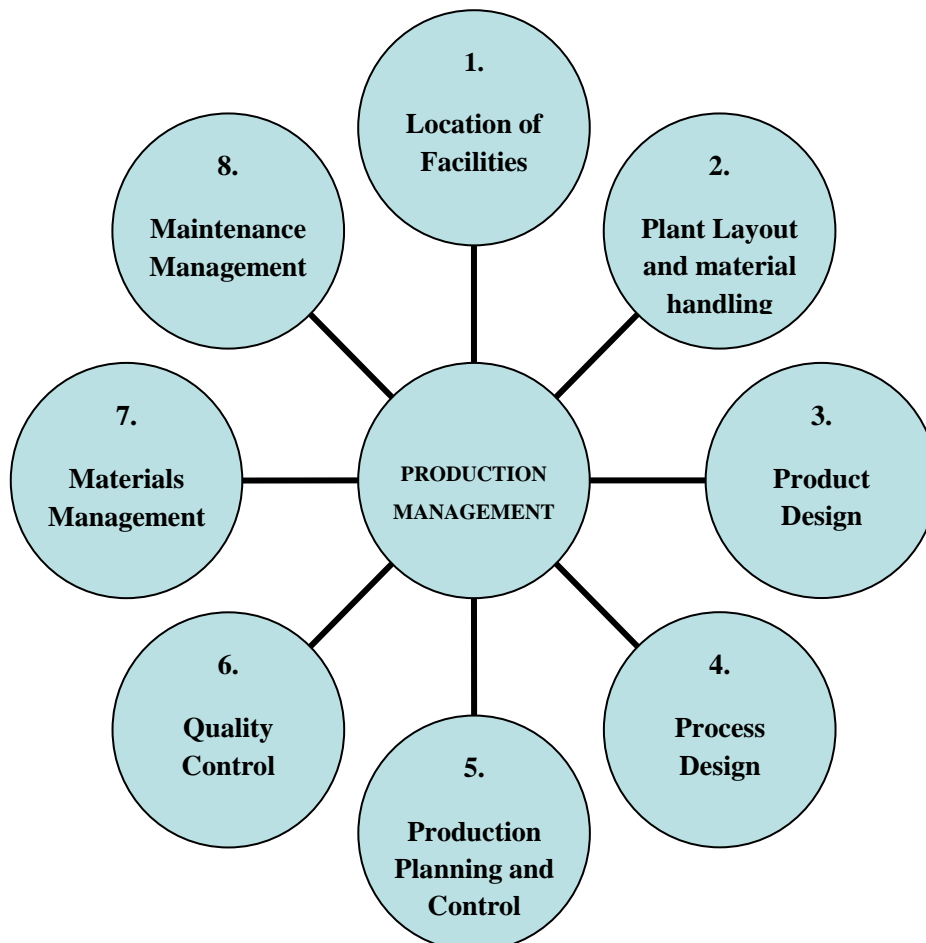
PRODUCTION MANAGEMENT:

It is a function of management, related to planning, coordinating and controlling the resources required for production to produce specified products, by specified methods, by optimal utilization of resources.

Objective of Production Management:

1. Ensure right product quality
2. Ensure right product quantity
3. Ensure right time
4. Ensure the right manufacturing cost

SCOPE OF PRODUCTION MANAGEMENT:



A. Facility Location

Selecting appropriate location is important/key as large investments are made in buildings and machinery.

An ideal location is one in which cost is minimum, market share is large, risk involved is least and has maximum social gain.

Selection Criteria:

1. Natural and Climatic Conditions
2. Availability and nearness to raw material
3. Access to market
4. Transportation cost of raw materials and finished goods
5. Availability of infrastructure facilities – seaports, airports, roads, railway station, electricity, water, communication facilities etc.
6. Availability of labour
7. Strategic considerations of safety and security
8. Government policies/influences
9. Nearness to banking and financial institutions

B. Plant Layout and Material Handling:

The objective of selecting a plant layout is to design a physical arrangement of facilities that meets the required output quality and quantity most economically

Definition:

Arrangement of physical facilities such as machinery, equipments, furniture etc. within the factory building in such a manner so as to have quickest flow of materials, at the lowest cost and with least amount of handling in processing the product from receipt of material to the shipment of the finished product.

Objective:

1. Proper and efficient utilization of available floor space
2. Provide enough production capacity

3. Reduce the material handling cost
4. Reduce hazards to personnel
5. Allow easy maintenance
6. Improve productivity
7. Provide ease of supervision and control

Types of Plant Layouts:

In manufacturing units there are 4 types of layouts. They are:

- a. Product/line Layout
- b. Process layout
- c. Fixed Position Layout
- d. Combined layout

C. PRODUCT DESIGN

It is the process of deciding the various product features and developing ideas about production.

Things to be considered while designing a product are:

- a. Customer requirement
- b. Product simplification
- c. Standardization of design and parts
- d. Reliability
- e. Maintainability
- f. Servicing etc.

They are also associated with production of engineering drawings of the product.

D. PROCESS DESIGN

Process of determining the production process.

- Machines to be used for production
- Parameter specifications
- Layout of facilities etc.

E. PRODUCTION PLANNING AND CONTROL

Production Planning:

- a. Planning: Foreseeing every future steps
- b. Routing: (determines where)
 - Path and sequence of operations are established
 - Machine and personnel requirements are deduced
- c. Scheduling: (determines time or when)
 - Assesses the time required for each activity
 - Time allowances are also made.
- d. Loading: (determines who)
 - Execution of the scheduled plan as per the route chalked out

Production Control:

- a. Dispatching:
 - Involves dispatch of production orders for starting the operations and also dispatch of materials from the warehouses
- b. Follow up:
 - Determination of progress of each work
 - Removing bottlenecks
 - Ensuring activities are moving according to the plan
- c. Inspection:
 - Ensure quality of goods

d. Corrective measures:

- Adjusting route
- Rescheduling
- Maintenance of machinery and equipments

F. QUALITY CONTROL

Aims at prevention of defects at the source

It relies on an effective feedback system

G. MATERIALS MANAGEMENT

It is concerned with the acquisition, control and use of materials needed:

Includes two departments:

- i. Purchase Dept.: Concerned with selection of order quantity, time of placement of order, selection of vendors etc.
- ii. Stores Dept.: Concerned with maintaining and ensuring adequate inventory facilities. Also deals with material distribution from the inventory.

H. MAINTENANCE MANAGEMENT

It is concerned with the detailed analysis of production facilities and maintenance procedures

Determination of the type of maintenance to be carried out and ensuring timely maintenance.

Ensuring availability of proper maintenance equipments, tools and personnel.

FUNCTIONS OF PRODUCTION MANAGEMENT

1. Forecasting the demand of the product to determine the factors of production
2. Arranging the factors required for production

3. Arranging services such as maintenance, material handling, inspection and quality control
4. Effective utilization of the factors of production

PRODUCTION MANAGEMENT FRAMEWORK

The 5 P's of Production Management Framework are:

1. Product
 - Most important factor
 - Involves selection of product to be produced
 - It is based on customer requirement, availability of resources and profit expected
2. Plant
 - Capacity: Based of production rate, speed of delivery etc.
 - Location
 - Layout
3. Process
 - Selection of process should consider factors like available capacity, available skills, type of production, layout of plant and equipment's, safety, production cost etc.
4. Programme
 - It is concerned with the date and time of product supply
 - To meet orders successfully, the organization should plan and control activities efficiently
5. Personnel
 - Success of production depends upon personnel involved
 - Special care for training and motivational activities

- Industrial relations, health and safety, remuneration are some other aspects that need special attention

PRODUCT LIFE CYCLE

It refers to the period from the product's first launch into the market until its first withdrawal. The product life cycle is divided into 4 stages:

a. Introduction Stage:

- First introduction into the market
- Sales will be low until the customers are aware of the product
- Advertising cost will be very high in order to increase the customer awareness about the product
- Primary goals is to establish a market and build primary demand

b. Growth Stage:

- Those products that survive the introduction stage tend to spend the largest time in this phase
- It is characterized by rapid growth in sales
- During the later parts of this stage, with arrival of competitors, there may be price competition and hence increased promotional costs in order to convince customers

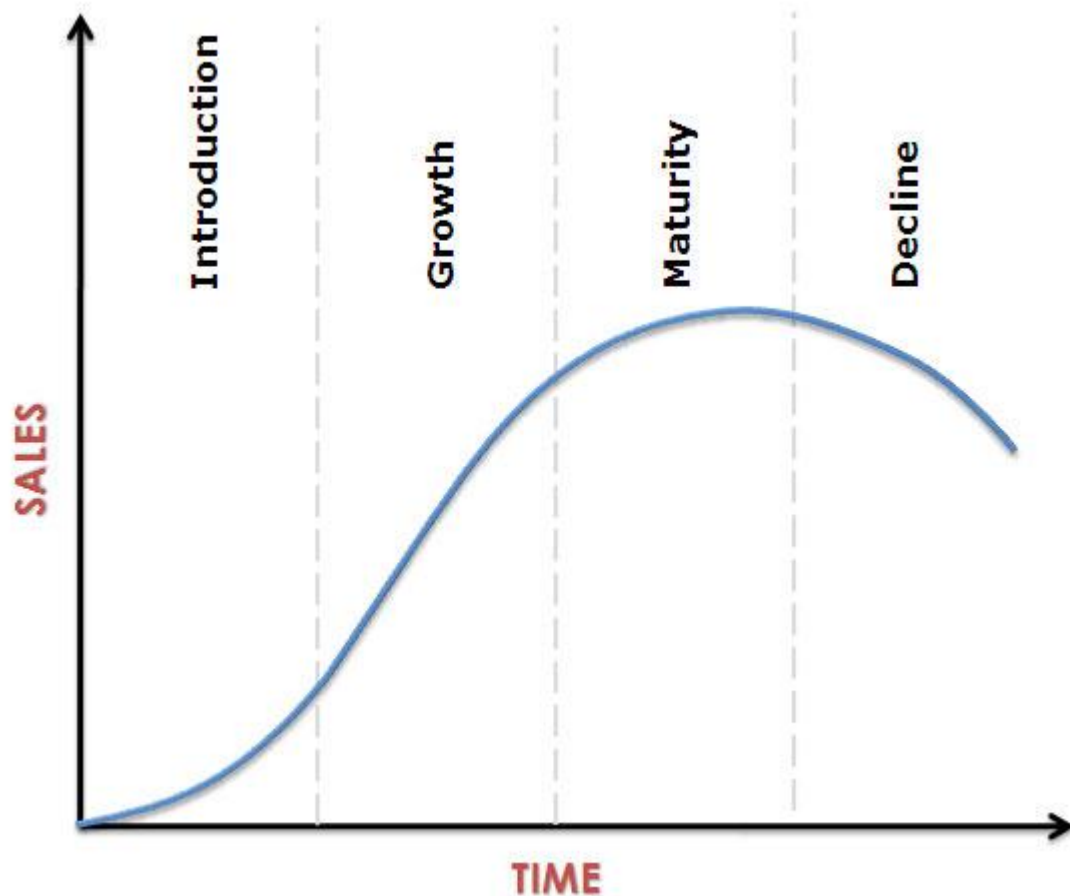
c. Maturity Stage:

- Sales growth will reach a point above which it will not grow, due to market share loss to competing products
- It is not the most profitable stage
- Similar competing products emerge in the market and hence the major hurdle here is the difficulty in differentiating the product

- Primary goal of the organization is to maintain the market share of the product and extend its life cycle.

d. Decline Stage:

- More innovative products introduced into the market and change in customer taste.
- Sales decline
- Product may become technologically obsolete



PRODUCTION PROCEDURE:

a. Sales forecasting phase:

- Manufacturing is triggered by customer order/ forecast of customer demand and current product availability with manufacturer/ finished goods stock (inventory) levels.
- After a detailed analysis, the sales department prepares a sales forecast.

b. Production Planning Activity Phase:

- Finance department prepares the production budget in consultation with the production department
- The engineering department is asked to prepare drawings and specifications
- Production quantities are finalized with the review of sales forecast.
- Production planning activity begins with the receipt of tech information from the engineering department
- Scheduling of production process (Routing, Scheduling, Loading, Inspection etc.)

c. Production Phase:

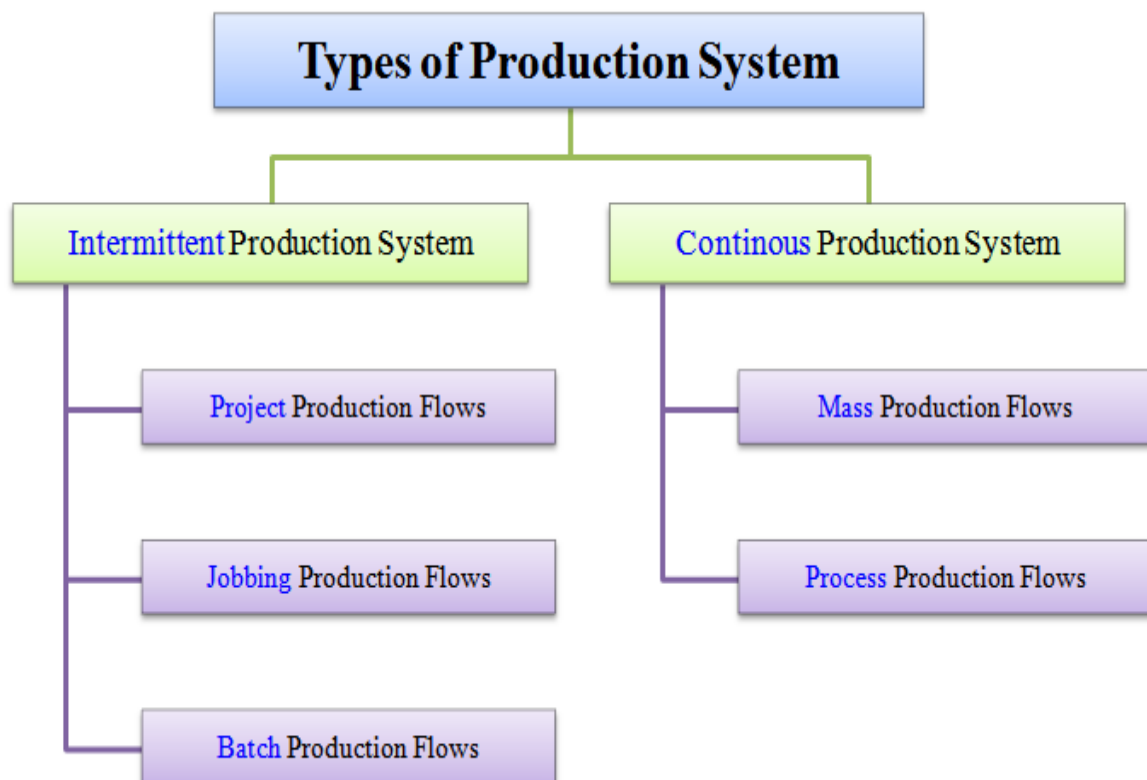
- Manufacturer produces according to the production schedule

d. Dispatching Phase:

- Finished products are shipped to the customers, retailers, distributors etc.

TYPES OF PRODUCTION SYSTEMS

Production Systems are basically classified into intermittent production and continuous production systems.

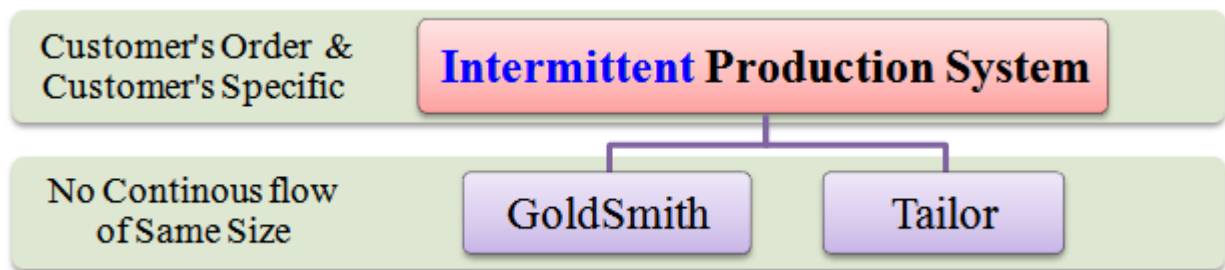


Intermittent production system

Intermittent means something that starts (initiates) and stops (halts) at irregular (unfixed) intervals (time gaps).

In the intermittent production system, goods are produced based on customer's orders. These goods are produced on a small scale. The flow of production is intermittent (irregular). In other words, the flow of production is not continuous. In this system, large varieties of products are produced. These products are of different sizes. The design of these products goes on changing. It keeps changing according to the design and size of the product. Therefore, this system is very flexible.

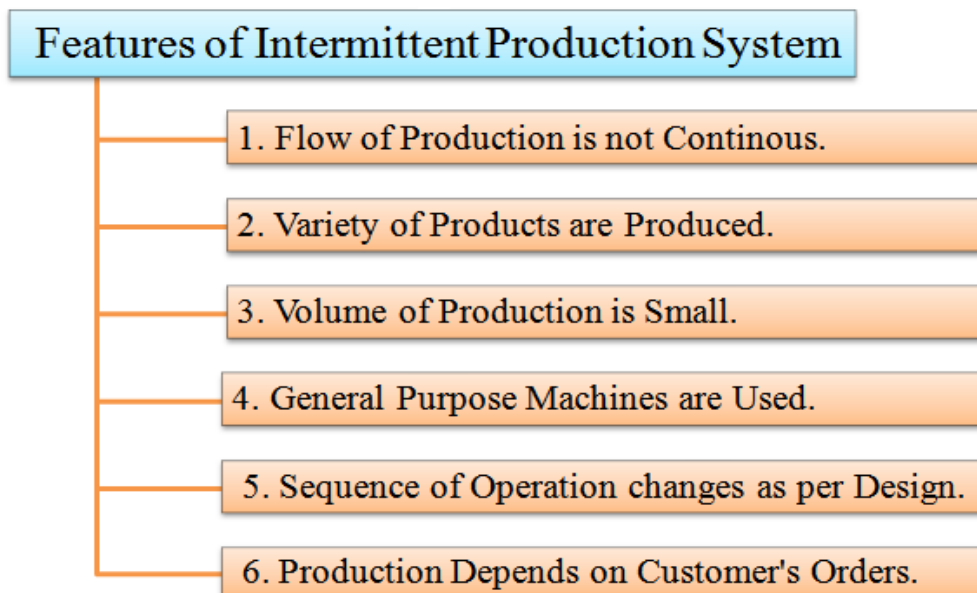
Following chart highlights the concept of an intermittent production system.



Following are examples on the intermittent production system. Please refer above chart while reading examples given below.

1. The work of a goldsmith is purely based on the frequency of his customer's orders. The goldsmith makes goods (ornaments) on a small-scale basis as per his customer's requirements. Here, ornaments are not done on a continuous basis.
2. Similarly, the work of a tailor is also based on the number of orders he gets from his customers. The clothes are stitched for every customer independently by the tailor as per one's measurement and size. Goods (stitched clothes) are made on a limited scale and is proportional to the number of orders received from customers. Here, stitching is not done on a continuous basis.

The features of an intermittent production system are depicted below.



The characteristics of an intermittent production system are listed as follows:

1. The flow of production is not continuous. It is intermittent.
2. Wide varieties of products are produced.
3. The volume of production is small.
4. General purpose machines are used. These machines can be used to produce different types of products.
5. The sequence of operation goes on changing as per the design of the product.
6. The quantity, size, shape, design, etc. of the product depends on the customer's orders.

The types of intermittent production system include:

1. Project production flows,
2. Jobbing production flows, and
3. Batch production flows.

1. PROJECT PRODUCTION

Project production is characterized by complex sets of activities that must be performed in a particular order within the given period and within the estimated expenditure. Where output of a project is a product, such products are generally characterized by immobility during transformation. Operations of such products are carried out in “fixed position assembly type of layout” which can be observed in production of ships, locomotive and aircraft, construction of roads, buildings, etc.

2. JOB PRODUCTION

Jobbing production is characterized by the manufacture of one or few numbers of a single product designed and manufactured strictly to customer's specifications, within, the given period and with the price fixed prior to the contract. Some typical examples of industries engaged in jobbing production are: general repair shops; special purpose machine tool manufacturers; workshops to manufacture jigs and fixtures for other units; building contractors; tailoring shops manufacturing made-to-measure suite of clothes; manufacturers of ships, cranes, furnaces, turbo-generators, pressure vessels; and others manufacturing articles made to customers' orders.

Small production runs

Discontinuous flow of materials

General purpose machines and process layout

Highly skilled labour

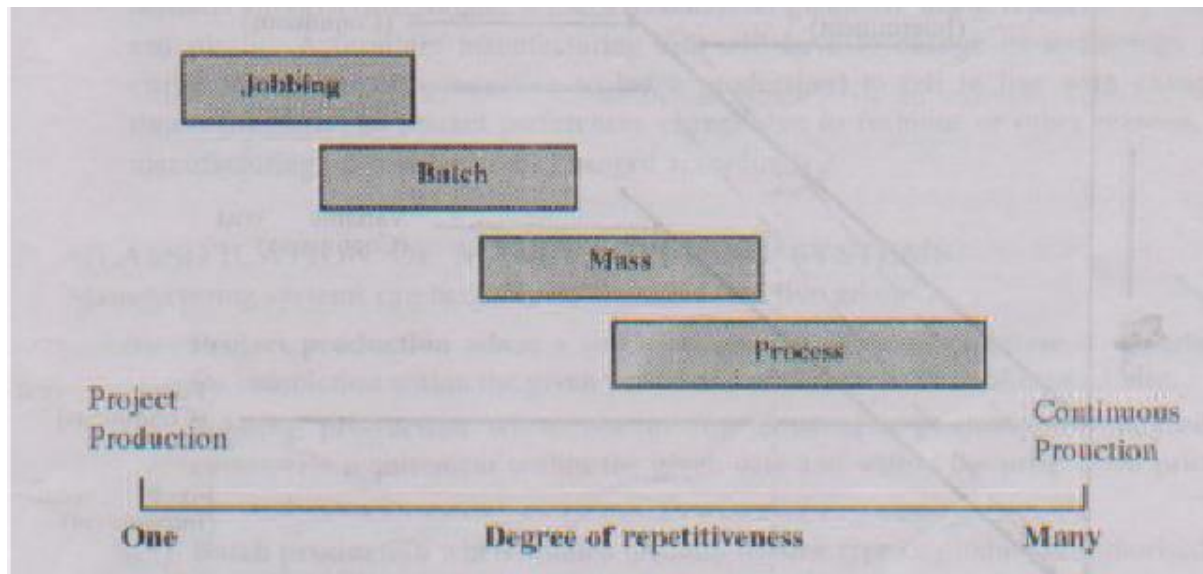
Highly skilled labour

Examples: Tailoring, Painting and decorating, Plumbing and heating repairs in the home

3. BATCH PRODUCTION

Batch production is characterized by the manufacture of a limited number of product (but many such, quantities of different products) produced at regular intervals and stocked in warehouses as finished goods (or finished parts,)awaiting sales (or withdrawal for assembly). Typical examples of batch production are: Process industries such as pharmaceuticals, paints, chemicals; medium and heavy engineering industry engaged in the manufacture of electric motors, switch gears, heavy motor vehicles, internal combustion engines; manufacturers of ready-made garments

Batch production is used to produce or process any product in groups that are called batches, as opposed to a continuous production process, or a one-time production. An example of batch production can be found in a bakery. The products, for example bread, are made in batches of however many will fit in the baker's oven at a time. When that batch is made, the baker will start the process again with a new batch. Batch production techniques are used in the manufacture of specialty chemicals such as active pharmaceutical ingredients, inks, paints and adhesives.

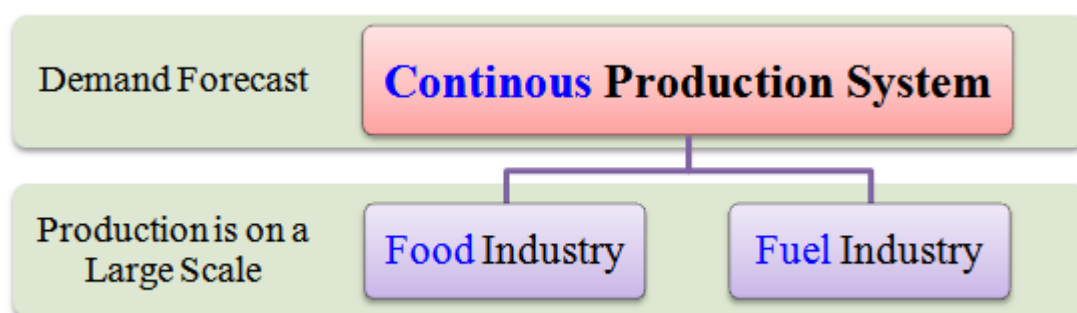


Continuous production system

Continuous means something that operates constantly without any irregularities or frequent halts.

In the continuous production system, goods are produced constantly as per demand forecast. Goods are produced on a large scale for stocking and selling. They are not produced on customer's orders. Here, the inputs and outputs are standardized along with the production process and sequence.

Following chart highlights the concept of a continuous production system.



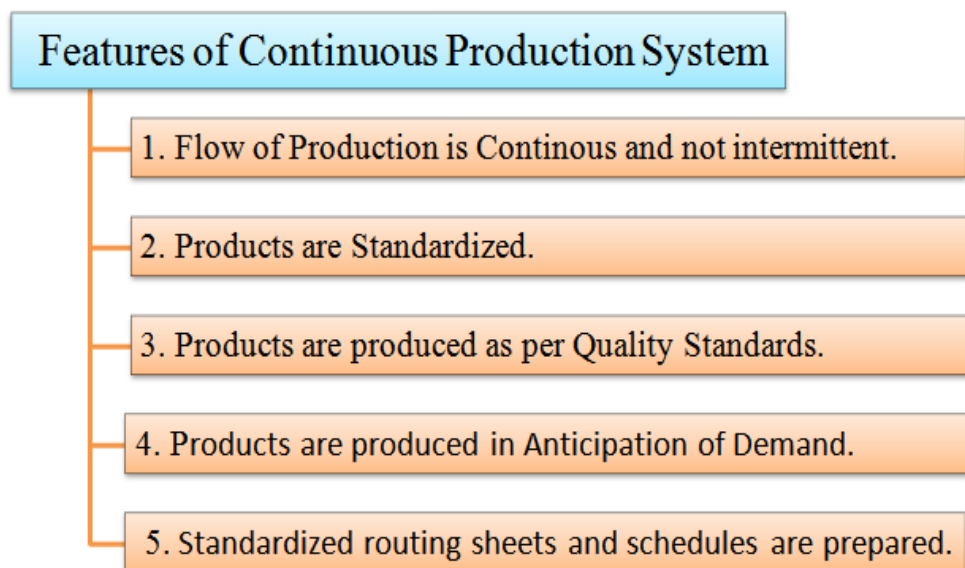
Following are examples on the continuous production system. Please refer above chart while reading examples given below.

1. The production system of a food industry is purely based on the demand forecast. Here, a large-scale production of food takes place. It is also a continuous production.
2. Similarly, the production and processing system of a fuel industry is also purely based on, demand forecast. Crude oil and other raw sources are processed continuously on a large scale to yield usable form of fuel and compensate global energy demand.

The characteristics of a continuous production system are listed as follows:

1. The flow of production is continuous. It is not intermittent.
2. The products are standardized.
3. The products are produced on predetermined quality standards.
4. The products are produced in anticipation of demand.
5. Standardized routing sheets and schedules are prepared.

The features of a continuous production system are depicted below.



The types of continuous production system include:

1. Mass production flows, and
2. Process production flows

1. MASS PRODUCTION

Mass production is the name given to the method of producing goods in large quantities at low cost per unit. But mass production, although allowing lower prices, does not have to mean low-quality production. Instead, mass-produced goods are standardized by means of precision-manufactured, interchangeable parts. The mass production process itself is characterized by mechanization to achieve high volume, elaborate organization of materials flow through various stages of manufacturing, careful supervision of quality standards, and minute division of labour. To make it worthwhile, mass production requires mass consumption. Until relatively recent times the only large-scale demand for standardized, uniform products came from military organizations. The major experiments that eventually led to mass production were first performed under the aegis of the military.

2. PROCESS PRODUCTION

Process production is characterized by the manufacture of a single product produced and stocked in the warehouses awaiting sales. The flexibility of such plants is almost zero as only one type of product can be produced in such plants. Typical examples of such plants are sugar, steel, cement, paper, coke, refineries, etc.

NETWORK ANALYSIS: