Module-1

CONCEPTS OF PPC

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8. **Prerequisites of PPC** – data pertaining to design, equipment, raw materials, tooling, performance standards, labour and operating systems

Introduction

Production…??

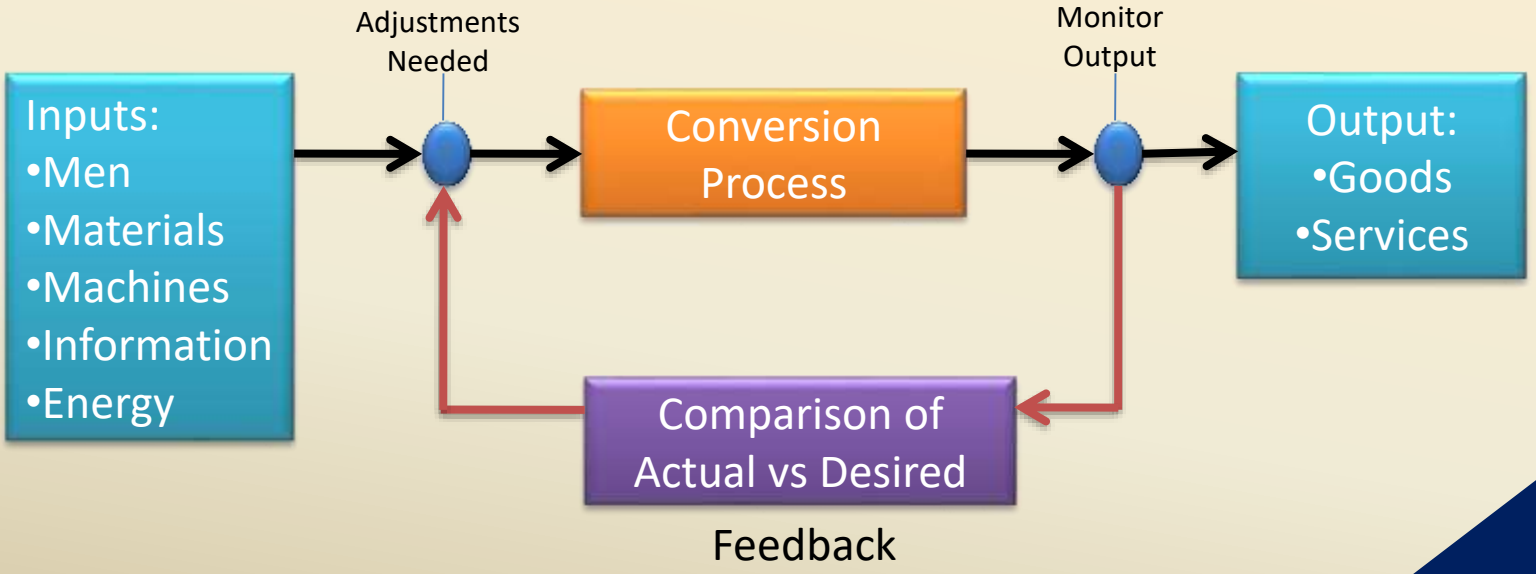
Manufacturing..??

Introduction

- **Production** converts inputs or intermediates to a final output or services, which may or may not use machinery.
- **Manufacturing** is the process of transforming raw materials into finished goods, by deploying various sequential processes, labour, and machinery. It requires physical facilities and produce tangible products

1. Manufacturing systems

- Manufacturing - is the application of tools and processes for the transformation of raw materials into finished products.



1. Manufacturing systems- Components

- Inputs- Men, machine, material, Information , Capital
- Transformation process- product design, product planning, production control. Maintenance
- Feedback- Inventory, quality, cost
- Output- product, services

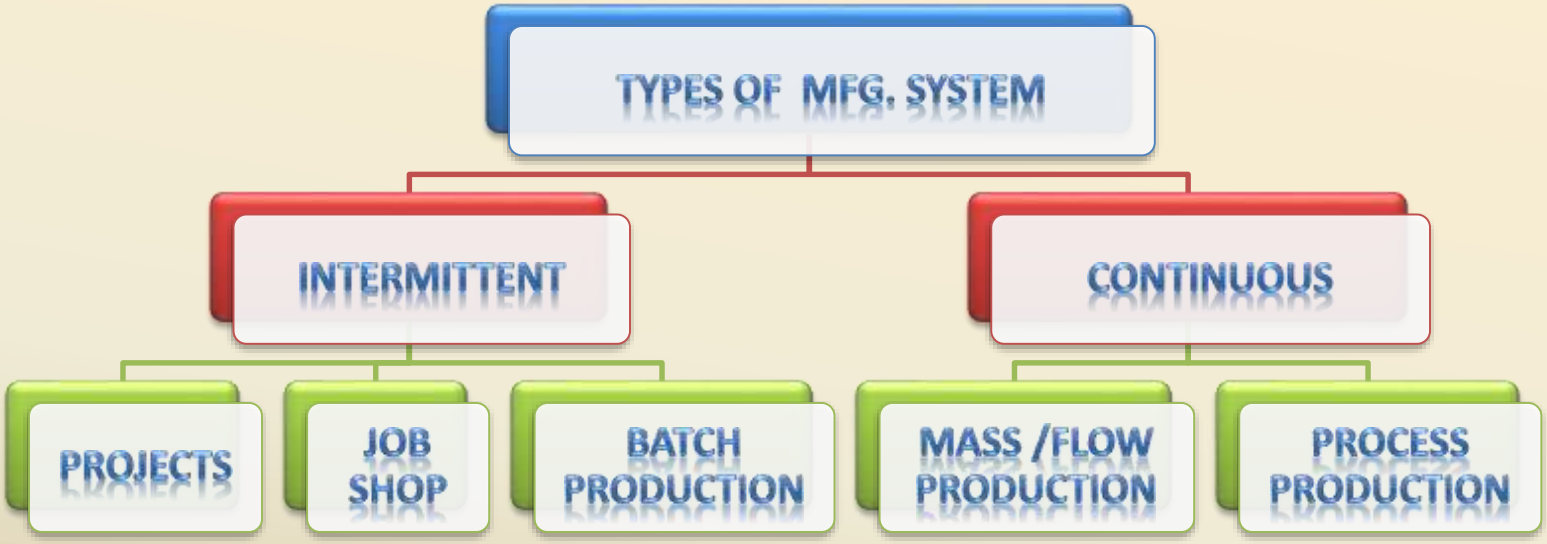
Manufacturing strategy

- There are different ways of offering a product or service from a company.
- **Make to Order**: Products are designed, produced and delivered to customer specifications in response to an order. Examples are custom-tailored clothes, custom-built homes, and component parts for a machine, a PCB for a schoolbased project. The important issues here are to meet the needs of the customer and to complete the order in the minimum amount of time.
- **Make to Stock:** Products are designed and produced for a ‘standard’ customer in anticipation of demand. The items are stored and the consumer chooses from a range of items that are available. Examples of this type of product would be consumer electronics such as an MP3 player, a house in a scheme built by a developer, or a litre carton of milk. The main issues relate to forecasting the demand for the item and maintaining the correct amount of item in stock.

1. Manufacturing strategy

- Assemble to Order Items: In this case, a base unit or module is produced onto which options can be added according the specification of the customer. A computer motherboard and cabinet can have different memory modules, hard drive, processor etc fitted during assembly to make a custom-built product. The difference between this and a make to order product it that the individual components have already been made and held in stock.
- Activity - Decide which category the following items fit into 1. A Burger in a fast food restaurant 2. A specially iced birthday cake from a baker 3. A made-to-measure suit of clothes 4. An off-the-hook jacket from a department store 5. A garden table set sold by a hardware shop

Manufacturing systems - Types



Projects-

A Project takes a long time to complete, involves a large investment of resources and produces one item at a time to a customer order. Examples include • roads, • construction projects, • aircraft manufacturing • new product development e.g. iPhone where the outcome of the project is a prototype iPhone.

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.

Projects-

Advantages of Project Management

The first and foremost advantage is the fact that a particular project is handled by separate project manager as he or she will concentrate only on that particular project that makes it more likely to achieve success.

Another pro of project management is that it helps the company in achieving efficiency when it comes to capital, labor, and other operational related expenses as it keeps a close watch on all the activities of the project which in turn helps the management in identifying the areas which are revenue leaking and helps the company in saving lot of capital.

It helps the company in developing managerial qualities in talented people by assigning them first small projects and then big projects which in turn create a favorable atmosphere in the company where people know that there is ample scope for growth.

Project management creates a system whereby workflow is measured and accounted for, ensuring that resources are used judiciously in fulfilling the goals of the project. This type of planning establishes expectations for staffers, provides clear directives and builds in procedures for quickly addressing unexpected outcomes.

Managing projects from start to finish can help control project costs and help a project manager retain control over his budget, identifying problems or issues before they turn into roadblocks. This can also help a business ensure on-time delivery, retain satisfied customers and project an image of competence and professionalism.

Effective project managers make determinations about appropriate staffing and team formation in the early stages of project planning. This can help ensure the right people with the most appropriate skill sets are assigned to tasks within the project, allowing the company to use its human resources judiciously and effectively.

Disadvantages of Project Management

The biggest disadvantage of project management is that sometimes it leads to overlapping of authority and responsibility between the top management and project management where they have different plans in mind which leads to confusion among the team members of project and further project suffering.

Another con of project management is that it may be possible that there is no competent staff to carry the responsibility of project manager and if management selects incompetent staff then project will be a failure leading to losses for the company

Job Shop-

Job-shop production are characterized by manufacturing one or few quantity of products designed and produced as per the specification of customers within prefixed time and cost. The distinguishing feature of this is low volume and high variety of products. A job-shop comprises of general-purpose machines arranged into different departments. Each job demands unique technological requirements, demands processing on machines in a certain sequence. Job-shop Production is characterized by: 1. High variety of products and low volume. 2. Use of general purpose machines and facilities. 3. Highly skilled operators who can take up each job as a challenge because of uniqueness. 4. Large inventory of materials, tools, parts. 5. Detailed planning is essential for sequencing the requirements of each product, capacities for each work centre and order priorities.

Job Shop-

Advantages Following are the advantages of Job-shop Production: 1. Because of general purpose machines and facilities variety of products can be produced. 2. Operators will become more skilled and competent, as each job gives them learning opportunities. 3. Full potential of operators can be utilized. 4. Opportunity exists for Creative methods and innovative ideas.

Limitations Following are the limitations of Job-shop Production: 1. Higher cost due to frequent set up changes. 2. Higher level of inventory at all levels and hence higher inventory cost. 3. Production planning is complicated. 4. Larger space requirements.

Batch production-

Batch Production involves moving groups of the product through the manufacturing process in groups or batches. The volume is relatively low and demand for the items can fluctuate. Examples of batch production are • bakeries, • furniture making • cheese making etc

Batch Production as a form of manufacturing in which the job pass through the functional departments in lots or batches and each lot may have a different routing. It is characterized by the manufacture of limited number of products produced at regular intervals and stocked awaiting sales. Batch Production is characterized by 1. Shorter production runs. 2. Plant and machinery are flexible. 3. Plant and machinery set up is used for the production of item in a batch and change of set up is required for processing the next batch. 4. Manufacturing lead-time and cost are lower as compared to job order production.

Batch production-

Advantages Following are the advantages of Batch Production: 1. Better utilization of plant and machinery. 2. Promotes functional specialization. 3. Cost per unit is lower as compared to job order production. 4. Lower investment in plant and machinery. 5. Flexibility to accommodate and process number of products. 6. Job satisfaction exists for operators. Limitations Following are the limitations of Batch Production: 1. Material handling is complex because of irregular and longer flows. 2. Production planning and control is complex.
3. Work in process inventory is higher compared to continuous production. 4. Higher set up costs due to frequent changes in set up.

Mass/Flow production-

Mass Production produces large volumes of a standard product for a mass market. The demand for the product is stable and the demand is high. Most consumer goods are produced using this method. Examples are • cars, • computers • fast food such as burgers There is usually a degree of automation involved.

Manufacture of discrete parts or assemblies using a continuous process are called Mass Production. This production system is justified by very large volume of production. The machines are arranged in a line or product layout. Product and process standardization exists and all outputs follow the same path. Mass Production is characterized by 1. Standardization of product and process sequence. 2. Dedicated special purpose machines having higher production capacities and output rates. 3. Large volume of products. 4. Shorter cycle time of production. 5. Lower in process inventory. 6. Perfectly balanced production lines. 7. Flow of materials, components and parts is continuous and without any back tracking. 8. Production planning and control is easy. 9. Material handling can be completely automatic

Mass/Flow production-

Advantages Following are the advantages of Mass Production: 1. Higher rate of production with reduced cycle time. 2. Higher capacity utilization due to line balancing. 3. Less skilled operators are required. 4. Low process inventory. 5. Manufacturing cost per unit is low. Limitations Following are the limitations of Mass Production: 1. Breakdown of one machine will stop an entire production line. 2. Line layout needs major change with the changes in the product design. 3. High investment in production facilities. 4. The cycle time is determined by the slowest operation

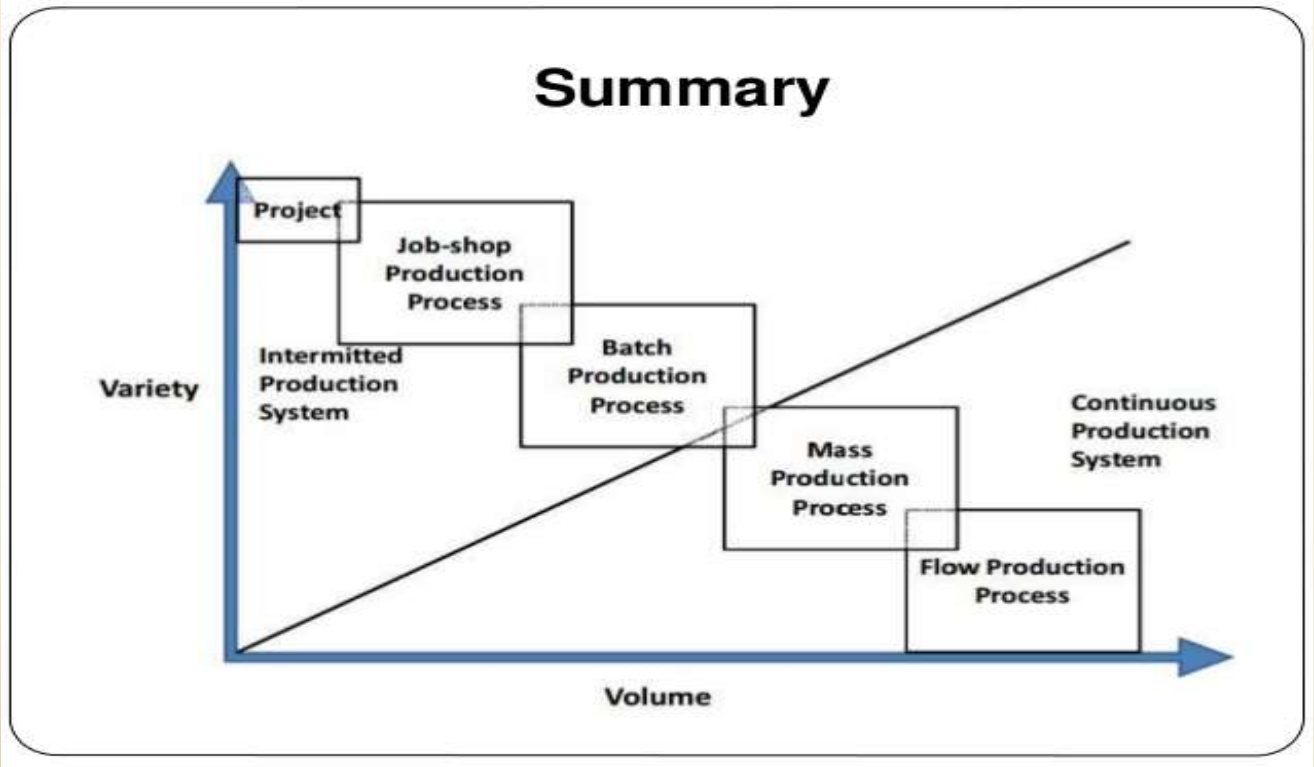
Process Production-

Production facilities are arranged as per the sequence of production operations from the first operations to the finished product. The items are made to flow through the sequence of operations through material handling devices such as conveyors, transfer devices, etc. Continuous Production is characterized by 1. Dedicated plant and equipment with zero flexibility. 2. Material handling is fully automated. 3. Process follows a predetermined sequence of operations. 4. Component materials cannot be readily identified with final product. 5. Planning and scheduling is a routine action.

Process Production-

Advantages Following are the advantages of Continuous Production: 1. Standardization of product and process sequence. 2. Higher rate of production with reduced cycle time. 3. Higher capacity utilization due to line balancing. 4. Manpower is not required for material handling as it is completely automatic. 5. Person with limited skills can be used on the production line. 6. Unit cost is lower due to high volume of production. Limitations Following are the limitations of Continuous Production: 1. Flexibility to accommodate and process number of products does not exist. 2. Very high investment for setting flow lines. 3. Product differentiation is limited.

Comparison of Basic Mfg. Types



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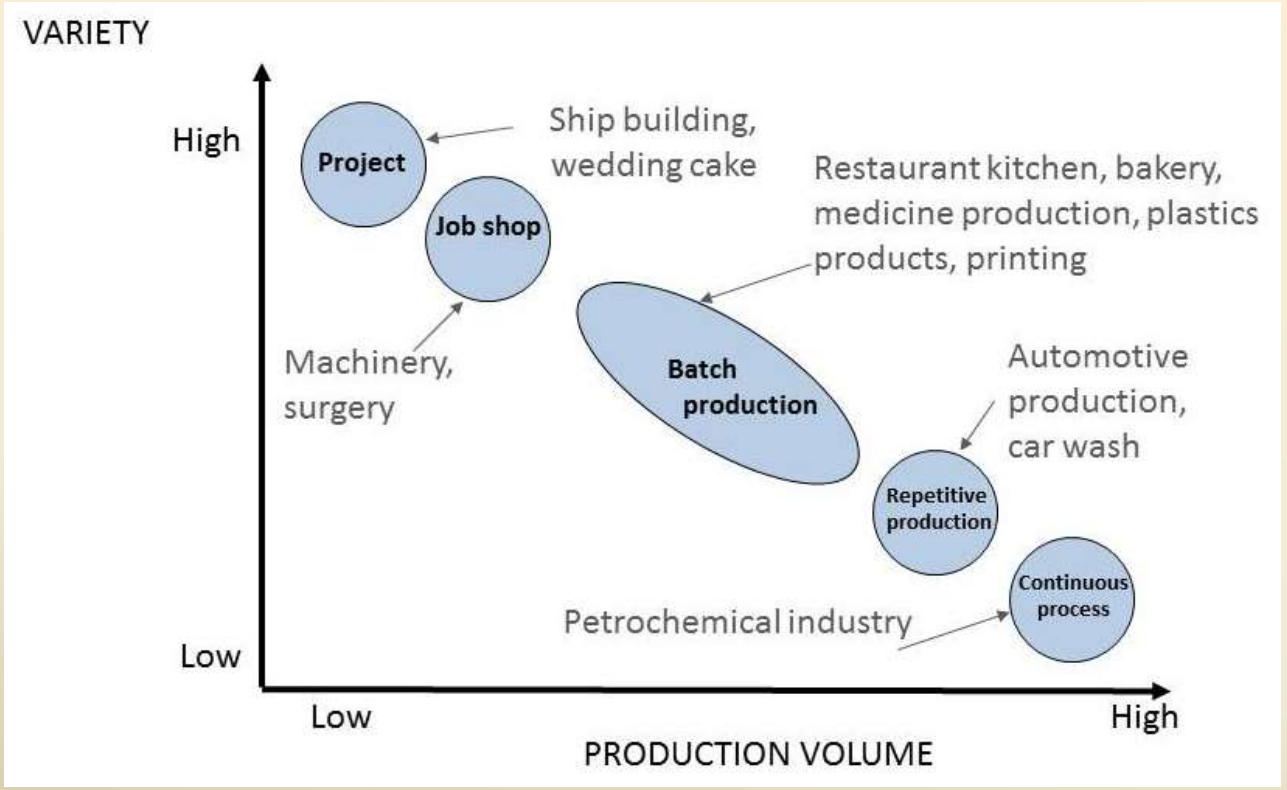


Comparison of Basic Mfg. Types

Basis of Comparison	Mass Production	Job Production	Batch Production
Meaning	Mass production means production of one or two standard products on a large scale.	Job production means manufacture of products as per specifications given by the customer. It is a special order production.	Batch production means production of a number of identical items to meet a specific order or to satisfy continuous market demand.
Method of Production	Here, the flow of materials is in a straight line. All facilities are arranged as per the sequence of operations. Standardization is the keynote of mass production method.	Job production is the manufacture of a single complete unit by an operator or a group of operatives. It is providing goods or services according to the needs of the customers.	In batch production, the work content of each unit is broken into a number of operations and operations are divided into groups for the completion of work group – wise.
Flexibility	Mass production method is highly inflexible.	The job production method using general purpose machines is more flexible.	Batch production is more flexible than Mass production method but is less flexible than Job production method.

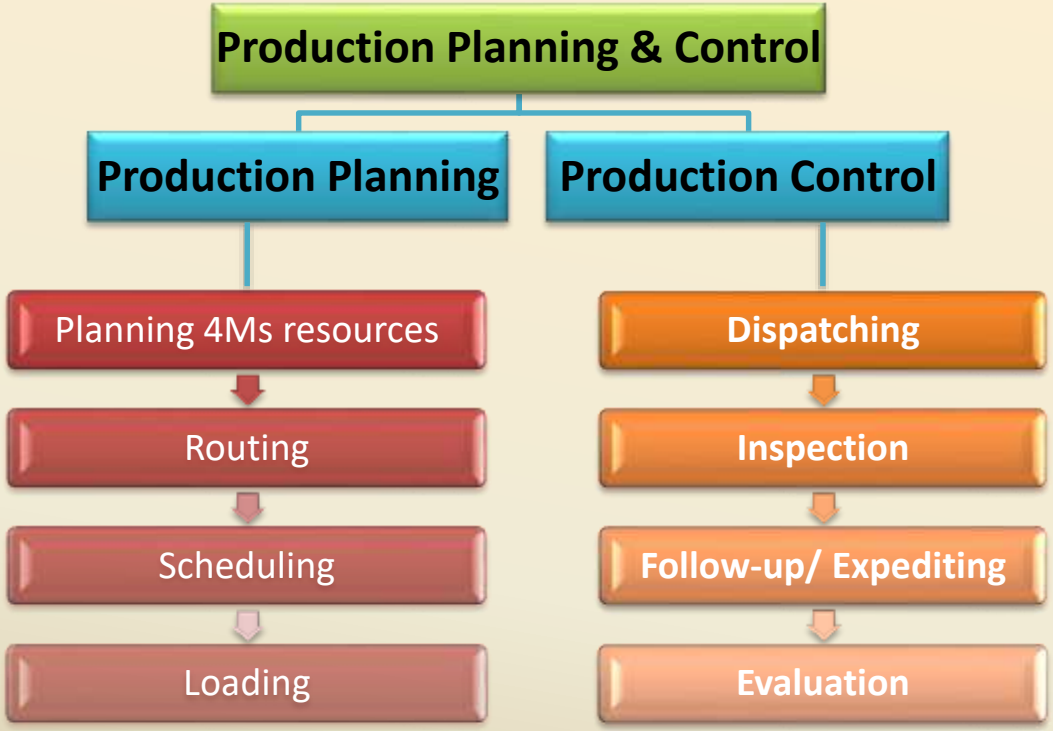
Comparison of Basic Mfg. Types

Basis of Comparison	Mass Production	Job Production	Batch Production
Capital Investment	Huge capital investment is required due to the duplication of machineries.	The capital investment required differs from type of job undertaken. For e.g. a tailor undertaking stitching job requires low investment whereas a road or dam constructing company requires huge capital investment.	Low capital investment is required as compared to Mass production and Job production.
Work in Process Inventories	Work in Process Inventories is small as output of one process becomes input of the next process.	Raw materials and work in process inventories are high due to the uneven and irregular flow of work.	Work in Process Inventory is high and large space is required due to production of more variety of products.
Skilled/ Unskilled Workers	Unskilled or semi-skilled workers are used as most of the work is machine based.	Highly skilled workers are required in a large quantity as production is highly specialized.	Semi- skilled and Skilled workers are required according to the type of production undertaken.
Examples	Products of mass consumption such as Colgate toothpaste, Lux soaps, etc.	Smalls jobs such as Tailoring or hairdresser and Big jobs such as construction of a house, dam or bridge building, etc.	Clothing, bakery and electrical goods.

2. Needs of PPC

1. Utilizes resources effectively.
2. Makes flow of production steady..
3. Estimates production resources.
4. Maintains necessary stock levels.
5. Coordinates departmental activities.
6. Minimizes wastage of resources.
7. Improves labor efficiency.
8. Helps to face competition.
9. Provides better work environment.
10. Facilitates quality improvement.
11. Customer satisfaction.
12. Reduces production costs.

3. Functions of PPC



4. Relationship of PPC with other functions

5. Factors influencing PPC in the organization

6.Manufacturing Methods

1. Projects & jobbing products
2. Batch production
3. Mass / flow production
4. Continuous / process production

6.1 Project/Jobbing Products

6.2 Batch Production

6.3 Mass/Flow Production

6.4 Continuous/Process Production

7. Organization of PPC

1. Status of PPC department
2. Internal structure
3. Degree of centralization
4. PPC as an integrated approach

7.1 Status of PPC Department

7.2 Internal Structure of PPC

7.3 Degree of Centralization

7.4 PPC as an Integrated Approach

8. Prerequisites of PPC

1. Data pertaining to Design
2. Data pertaining to Equipment
3. Data pertaining to Raw materials
4. Data pertaining to Tooling
5. Data pertaining to Performance standards
6. Data pertaining to Labour
7. Data pertaining to Operating systems

8.1 Data pertaining to Design

8.2 Data pertaining to Equipment

8.3 Data pertaining to Raw Materials

8.4 Data pertaining to Tooling

8.5 Data pertaining to Performance Standard

8.6 Data pertaining to Labour

8.7 Data pertaining to Operating System