Production system:

• A production system is a process that produces goods or services.
It involves the conversion of raw materials into finished products through a series of operations or activities.
• The production system can be designed in various ways depending on the nature of the product, volume of production, resources available, and other factors.
The main goal of a production system is to produce high-quality products efficiently and effectively while minimizing costs and maximizing profits.

Design of production system:

The design of a production system refers to the process of planning and developing an efficient and effective method of producing goods or services. It involves the analysis of the production process, identification of the required resources, and determination of the best way to organize these resources to ensure that the production process is efficient and cost-effective, which in turn leads to increased profitability and customer satisfaction. It involves several key steps including:

1. Determining the product or service to be produced: The first step in designing a production system is to identify the product or service that the organization intends to produce. This involves analyzing the market demand, identifying the customer requirements, and determining the desired output.

2. Analyzing the production process: The next step is to analyze the production process and identify the various activities involved in producing the product or service. This involves determining the sequence of activities, the time required for each activity, and the resources required.

3. Identifying the required resources: Once the production process has been analyzed, the next step is to identify the resources required to carry out the process. This includes identifying the materials, labor, equipment, and other resources required.

4. Determining the layout of the production system: The layout of the production system is important for ensuring that the resources are organized in the most effective way possible. This involves determining the location of the resources, the sequence in which they will be used, and the flow of materials and goods through the production process.

5. Determining the production capacity: The production capacity of the system is determined by analyzing the demand for the product or service and the availability of resources. This involves determining the number of products that can be produced within a given time frame and the resources required to achieve this level of production.

Types of production system:

The two main types of production systems are:

• Intermittent Production System:

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

• Continuous Production System:

1. Mass production flows
2. Process production flows

Intermittent Production System:

Intermittent production system refers to a manufacturing system in which the production of goods is based on customer orders and the flow of production is not continuous, but rather occurs in irregular intervals. This system is characterized by the production of a wide variety of products on a small scale. The design of these products keeps changing according to the customer's orders, making the system very flexible.

Some examples of intermittent production system are the work of a goldsmith, who produces ornaments on a small scale basis as per the customer's requirements, and a tailor, who stitches clothes for each customer independently as per one's measurement and size. In this system, general- purpose machines are used, and the sequence of operation keeps changing as per the design of the product.

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The characteristics or features features of intermittent production system are:

1. Production flow is not continuous but intermittent
2. Wide variety of products are produced
3. Small volume of production
4. General-purpose machines are used
5. Sequence of operation changes as per the design of the product
6. The quantity, size, shape, design, etc. of the product depends on the customer's orders.

• The three main types of intermittent production systems are:

1. Project Production Flow: This type of production system is used to manufacture products that are unique and are only produced once. It involves a large amount of planning and coordination, as every project is different. Examples include constructing a building, designing a new car model, or producing a one-time special event.

2. Jobbing Production Flow: In this type of production system, small quantities of products are produced according to the customer's requirements. This production system characterized by a high level of customization and flexibility. For example, a carpenter who makes custom furniture would use jobbing production flow to produce unique pieces of furniture for each customer.

3. Batch Production Flow: This type of production system is used to manufacture products in small batches. It involves producing a limited quantity of products that are made to a specific design. Examples include producing a limited quantity of t-shirts with a specific design, or manufacturing a batch of cookies with a particular recipe.

Continuous Production System:

• A continuous production system is a type of manufacturing system that operates constantly without any interruptions or frequent halts. In this system, goods are produced on a large

scale for stocking and selling, based on demand forecasts rather than individual customer orders. The inputs and outputs are standardized, and the production process and sequence are predetermined.

• Examples of continuous production systems include the food industry, where large-scale production of food takes place based on demand forecasts, and the fuel industry, where crude oil and other raw sources are processed continuously on a large scale to yield usable forms of fuel and meet global energy demands.

• The characteristics or features of continuous production system are:

1. Production is continuous, without any interruptions
2. Products are always the same, following a standard format
3. Quality is pre-determined and maintained throughout production based on
4. Products are are made in advance, based forecasted demand
5. Standardized schedules and instructions are used for the production process.

• The two main types of continuous production systems are:

1. Mass Production Flows: Mass production flows involve the production of a large quantity of a standardized product. The production process is continuous, and the products are produced in large volumes using specialized machinery. For example, producing thousands of cars, manufacturing a large quantity of pharmaceutical products, or producing thousands of packaged food items.

2. Process Production Flows: Process production flows involve the production of a continuous flow standardized product. The production process is divided into a sequence of steps, and each step is performed by specialized machinery. For example, refining crude oil into petroleum products, producing chemicals, or producing electricity.

Production Planning & Control (PPC):

• PPC, or Production Planning and Control, is a process used in manufacturing to ensure that products are produced efficiently, on time, and at the desired quality level. It involves the coordination of resources, including people, machines, and materials, to meet production goals while minimizing waste and maximizing efficiency.

• Production planning is the process of determining what products to produce, how much to produce, and when to produce them. It involves creating a production schedule, identifying necessary resources, and setting production targets.

• Production control, on the other hand, is the process of monitoring and controlling the production process to ensure that it runs smoothly and according to plan. This involves tracking production progress, identifying and resolving issues that arise, and adjusting production plans as necessary.

• Together, production planning and control helps manufacturers to optimize their resources, minimize waste, and increase productivity, which ultimately leads to higher profits.

• The main objectives of PPC are:

1. Meeting production targets
2. Optimizing utilization of resources
3. Ensuring timely delivery of products
4. Reducing production costs
5. Ensuring quality control
6. Minimizing production downtime
7. Enhancing customer satisfaction

8. Improving production efficiency
9. Facilitating continuous production processes.

Steps of PPC:

The following are the six steps involved in the PPC process:

1. Planning: The first step in PPC is planning, where the production plan is formulated based on the sales forecast and market demand. The production plan is a document that outlines the quantity and type of products that need to be produced within a specific period. The plan takes into consideration the production capacity, availability of resources, and other factors that could impact production.

2. Routing: After the production plan is formulated, the next step is routing. Routing involves determining the sequence of operations that need to be performed to produce a product. It also involves determining the machines, tools, and equipment required for each operation.

3. Scheduling: The third step is scheduling, which involves creating a timetable for production. The timetable outlines the start and end times for each operation, taking into account the availability of resources and the lead time required for each operation.

4. Loading: After scheduling, the next step is loading. Loading involves assigning the work to machines and operators based on the production schedule. The goal of loading is to ensure that the machines and operators are utilized to their maximum capacity while meeting the production targets.

5. Dispatching: The next step is dispatching, which involves releasing the work orders to the shop floor. The dispatching process involves providing the necessary instructions to the operators, such as the materials required, the sequence of operations, and the production targets.

6. Follow up: Inspection and Correction: The final step in the PPC process is follow up, which involves monitoring the production process and making corrections where necessary. Follow up involves inspection of the work in progress to ensure that it meets the quality standards, identifying any deviations from the production plan, and taking corrective actions to ensure that the production targets are met.