SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
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DEPARTMENT OF MECHATRONICS ENGINEERING

19MCE302 – INTELLIGENT MANUFACTURING TECHNOLOGY

III YEAR V SEM

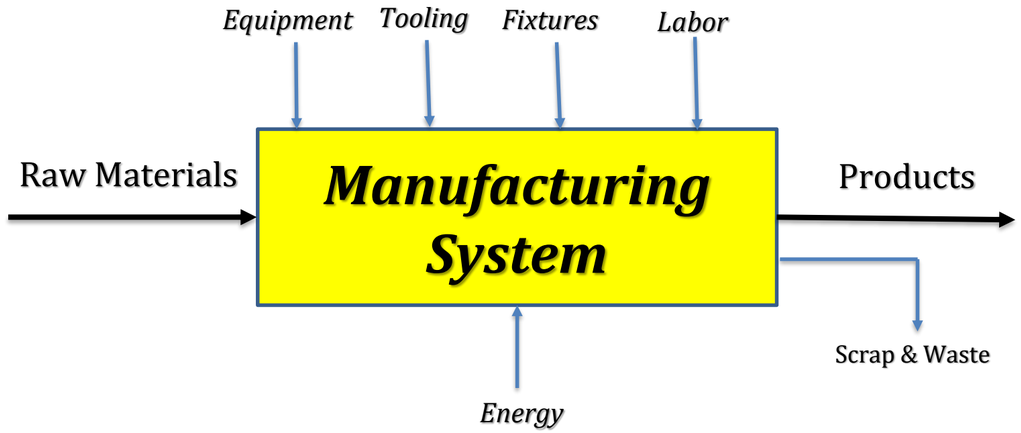
UNIT 1 – MANUFACTURING SYSTEMS AND MODELS

TOPIC 2 – TYPES AND PRINCIPLES OF MANUFACTURING SYSTEMS

MANUFACTURING SYSTEM

- A Manufacturing System is a collection of integrated equipments and human resources whose function is to perform one or more processing and/or assembly operations on a raw material, part or set of parts.

- A set of operations performed on material which brings them closer to the desired final form.

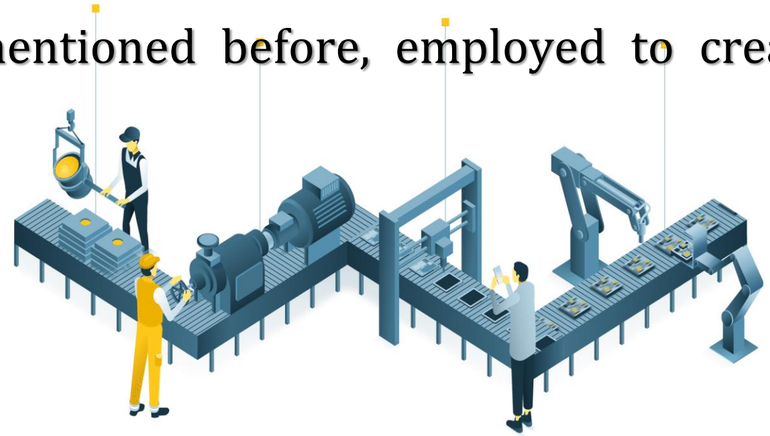


MANUFACTURING SYSTEM - OPERATIONS

All operations here are concerned with **input-output** process.

- **Input:** Men, materials, drawings, machines, etc.
- **Transformation:** Operations, material handling, procurement, etc.
- **Output:** The final goods and services.

Thus the combination of operations and activities mentioned before, employed to create goods or services is termed as manufacturing systems.

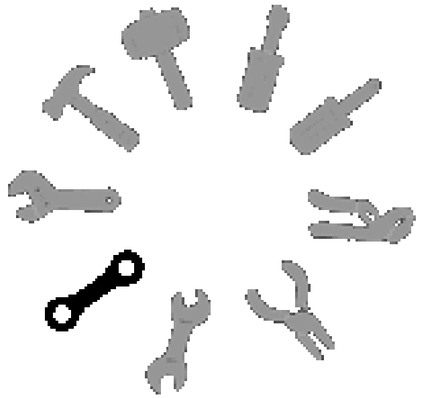


SELECTION – MANUFACTURING SYSTEMS

It must be able to meet the specifications det for the final product and be cost effective.

The factors affecting the selection are:

- Effect of Volume
- Capacity of Plant
- Flexibility
- Lead Time
- Efficiency
- Environment

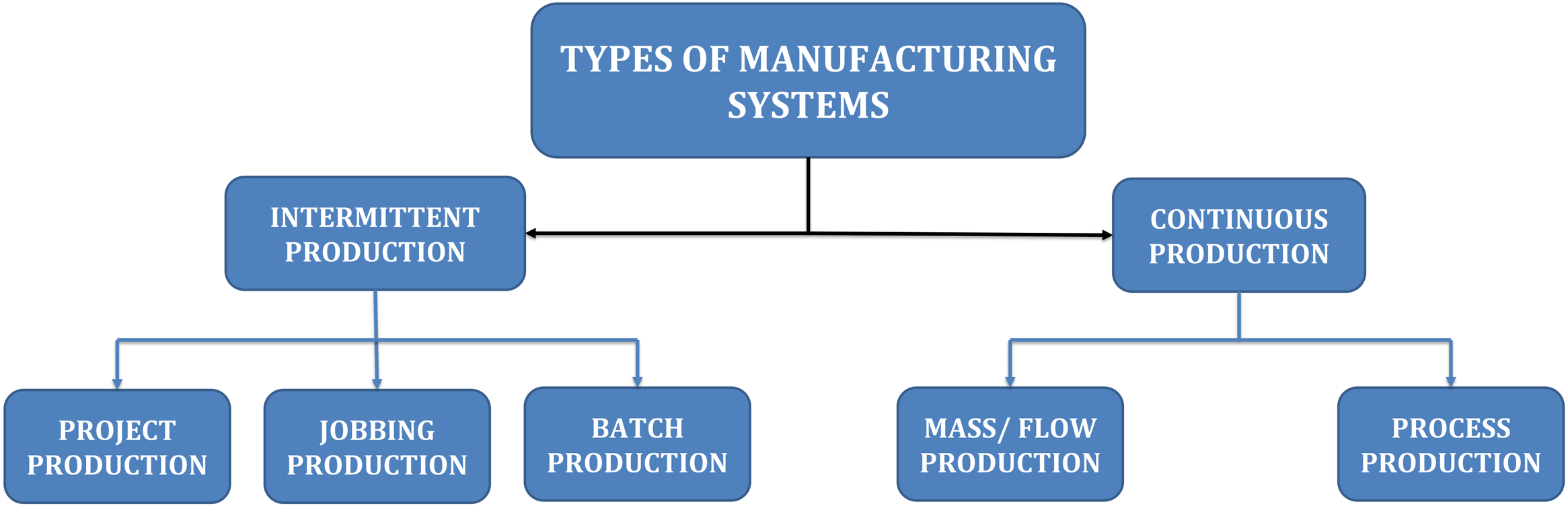


CLASSIFICATION – MANUFACTURING SYSTEMS

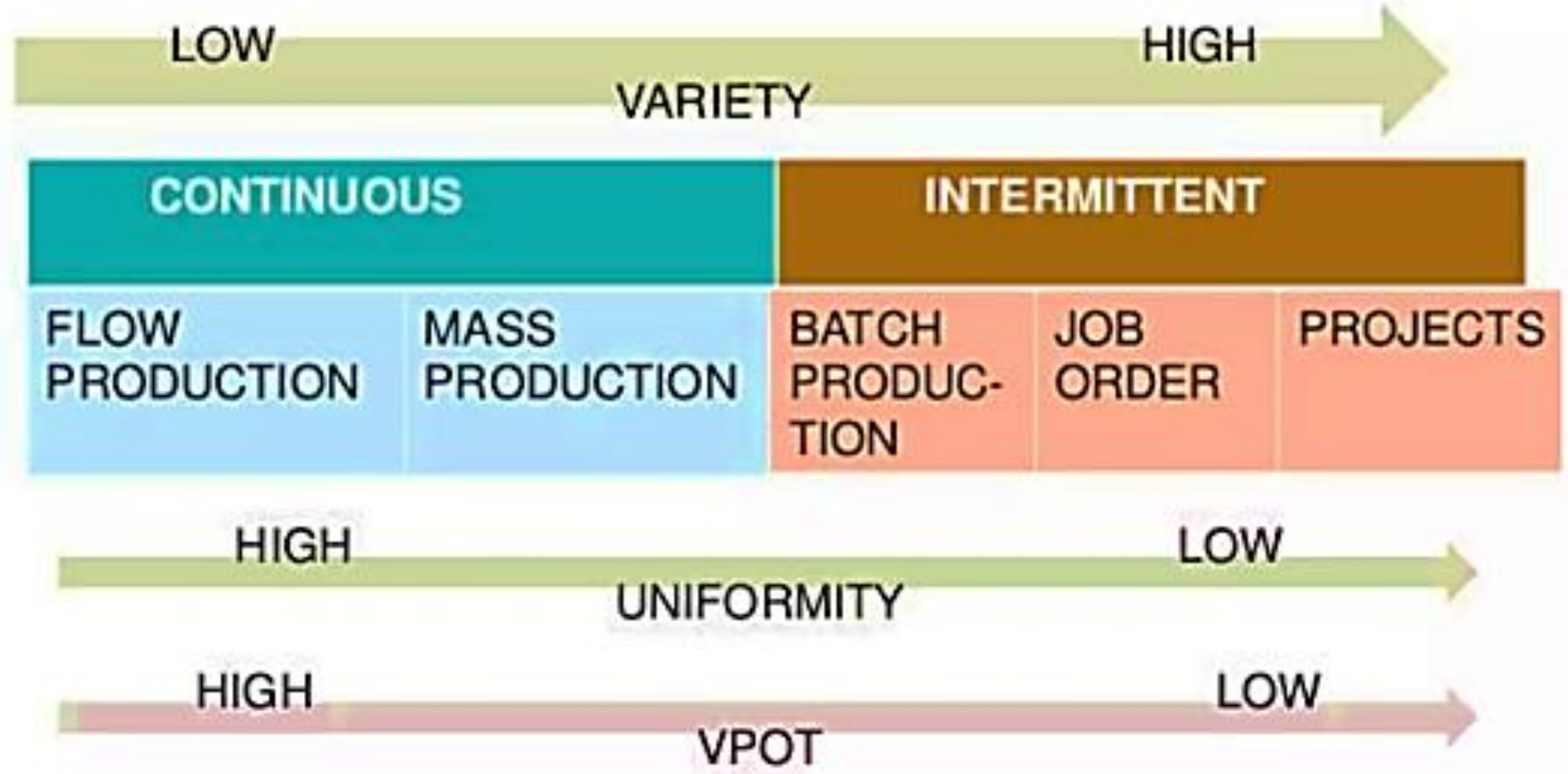
Factors that define and distinguish manufacturing systems:

- Types of operations performed
- Number of Workstations
- System Layout
- Automation and Manning Level
- Part or Product variety

TYPES – MANUFACTURING SYSTEMS



TYPES – MANUFACTURING SYSTEMS



TYPES – MANUFACTURING SYSTEMS

On Basis of Material Handling and labor:

CONTINUOUS	INTERMITTENT
1.UNSKILLED AS WELL AS SMALL TEAM OF SPECIALISED LABOUR FORCE	1.HIGHLY SKILLED LABOUR FORCE
2.MECHANIZED MATERIAL HANDLING	2.NOT FEASIBLE TO EMPLOY MECHANIZED HANDLING
3.MATERIAL HANDLING COST IS LESS	3.MATERIAL HANDLING COST IS HIGHER
4.INVESTMENT IN INVENTORY IS HIGHER	4.NEED FOR INVENTORY IS MINIMISED

TYPES – MANUFACTURING SYSTEMS

On Basis of Machinery:

CONTINUOUS	INTERMITTENT
1.SPECIFIC MACHINERY	1.GENERALISED MACHINERY
2.PERMANENT MACHINE SETUP	2.FREQUENT CHANGES IN MACHINE SETUP
3.DUPLICATION OF MACHINES	3.LESS MACHINES REQUIRED

TYPES – MANUFACTURING SYSTEMS

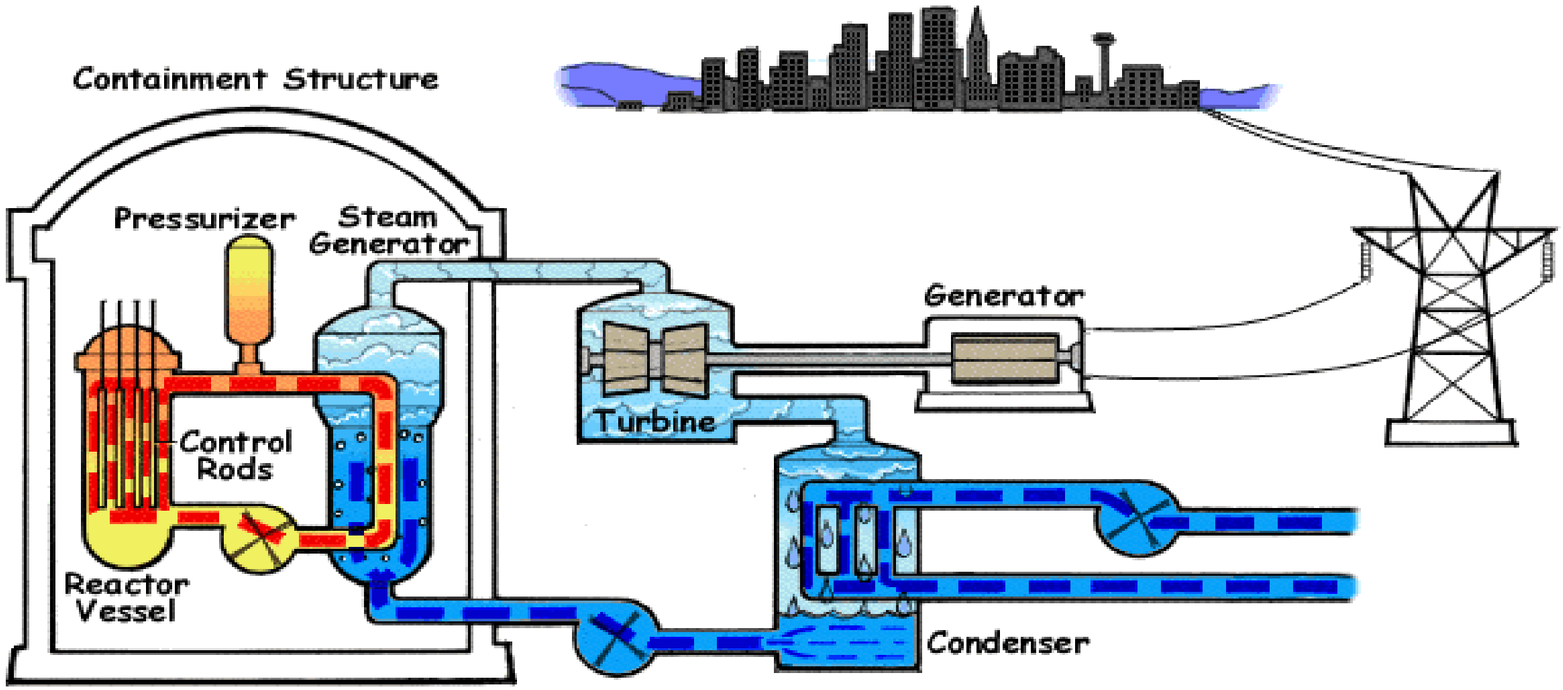
On Basis of Output Produced:

CONTINUOUS	INTERMITTENT
1.FEW STANDARD PRODUCTS IN LARGE QUANTITIES	1.WIDE RANGE OF PRODUCTS IN SMALL QUANTITIES
2.OUTPUT ON THE BASIS OF ANTICIPATION OF DEMAND	2.OUTPUT ACCORDING TO ORDER RECEIVED

MANUFACTURING SYSTEMS – CONTINUOUS PRODUCTION SYSTEMS

1. FLOW TYPE:

- Output cannot be segregated into different units
- High degree of output
- Output cannot be measured directly
- Eg.: Powerplant



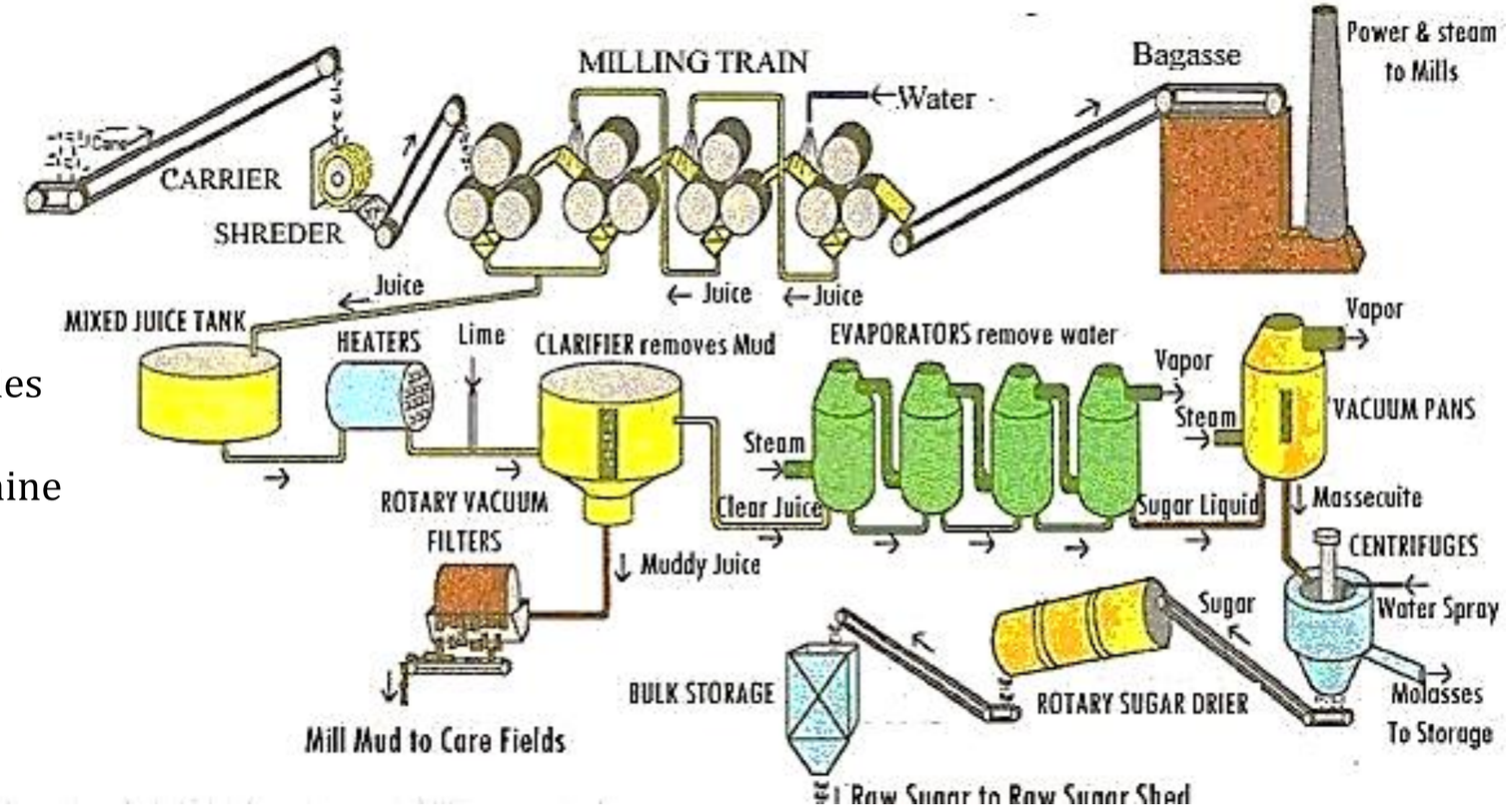
MANUFACTURING SYSTEMS – CONTINUOUS PRODUCTION SYSTEMS

2. MASS PRODUCTION:

- Straight line flow of material
- Output visible as identical units
- Standardised output produced in large quantities

Problems: Balancing production lines, Machine maintenance, raw material

Eg.: Sugar Production



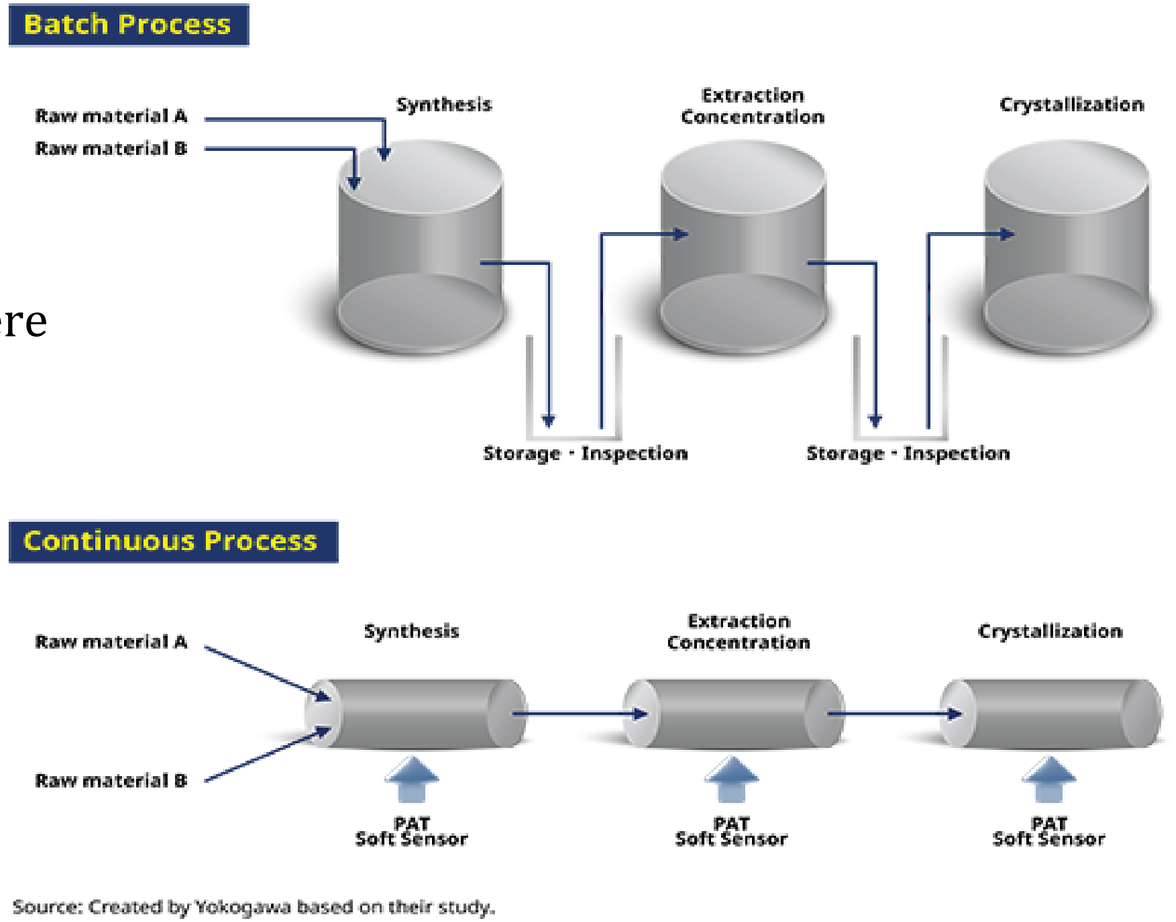
MANUFACTURING SYSTEMS – INTERMITTENT PRODUCTION SYSTEMS

1. BATCH PRODUCTION SYSTEM:

- Variety of products made in small quantites
- Various products compete for share of machine
- Outputs are aggregated in form of batches, where batches can have similar or dissimilar outputs

Problems: Machine- Job allocation problem

Eg.: Electrical goods



Source: Created by Yokogawa based on their study.

MANUFACTURING SYSTEMS – INTERMITTENT PRODUCTION SYSTEMS

2. JOB ORDER PRODUCTION SYSTEM:

- Does not have its own standard product but accepts whatever customer orders.
- Output identifiable in terms of specific job order
- Material flow complex

Eg.: Tailor Shop

3. PROJECT PRODUCTION SYSTEM:

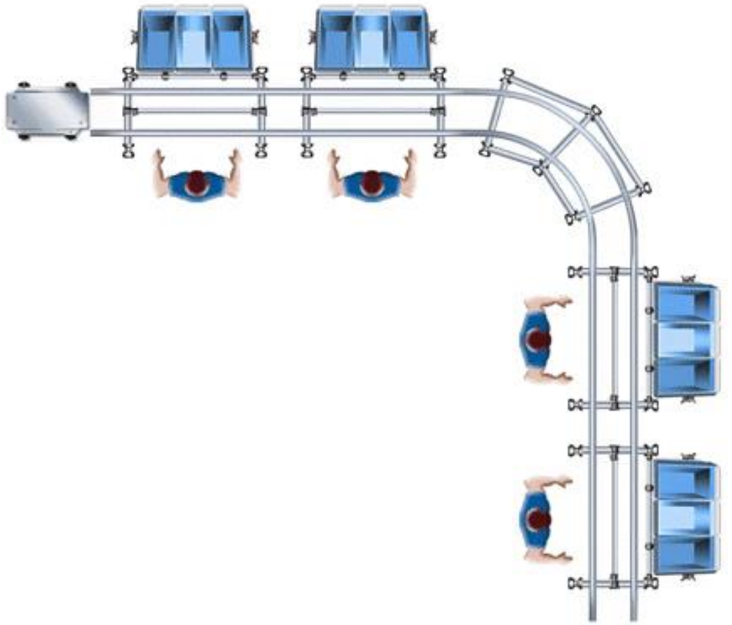
- It uses resources on different projects
- Product remains fixed and manpower and facilitates put work on it
- PERT/CPM can be used for planning and control

MANUFACTURING SYSTEMS – LEAN MANUFACTURING

- "**lean**", is a systematic method for the elimination of waste within a manufacturing system.
- The waste includes:-

1. **Overproduction** – producing more than the consumers demand.
2. **Waiting** –waiting for the next production step, interruptions of production during shift change.
3. **Inventory** – supply levels and work in progress inventories too high.
4. **Transportation** – moving products that are not actually required to perform the processing and the efficiency with which the product is transported.
5. **Over-processing** - working on the same product again and again thereby reducing its efficiency.

- It aims at increasing the efficiency and minimizing the cost of the product.



THANK YOU

QUESTIONS?