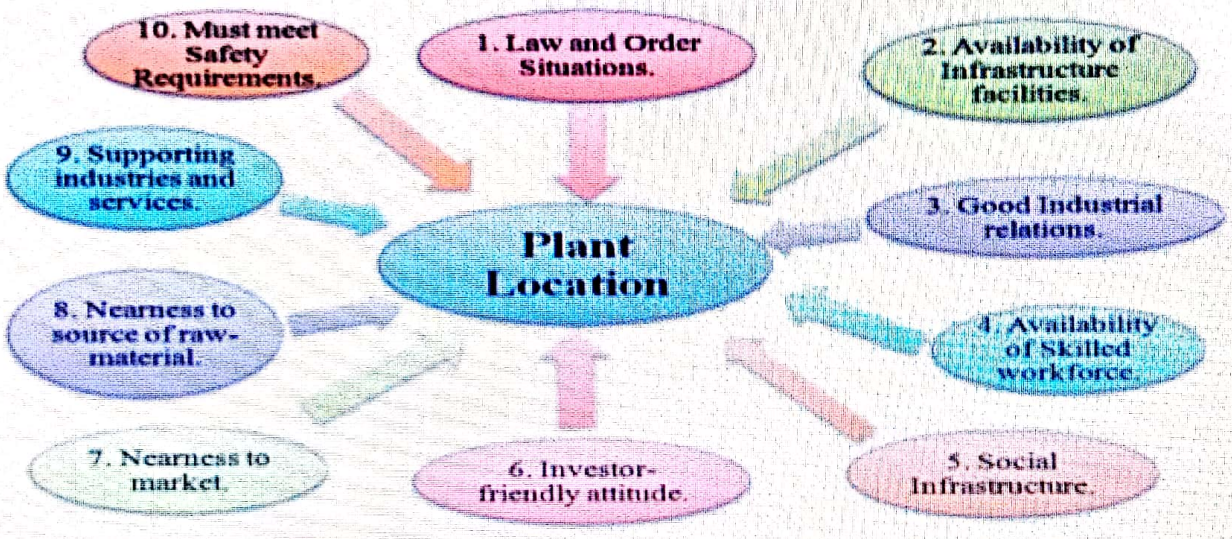
Plant Location & Layout

Factors influencing Location decision

- Political, social and legal policies – Plans, Regulations, incentives, taxes
- Availability and Cost of land
- Availability of labour and skills
- Availability of raw material
- Existing capacities
- Proximity to the market
- Infrastructure availability – Telecom, power, transport, roads, ports
- Presence of Similar industries

Employee Factors

- Availability of amenities – Power, water, land, Transport, schools, recreation, housing
- Safety requirements
- Suitability of land and climate
- Society – Values, systems, aspirations and needs



Factors affecting plant location

Other factors which also affect plant location are availability and cost of land, suitability of land - soil and topography, climatic conditions, location of a similar unit, etc.

Plant Layout

Physical arrangement of equipment and facilities within a plant to ensure a smooth flow of work, material, people and information.

Objectives:

- Minimize
  Investment in equipment
  Overall production time
  Utilize existing space effectively
  Material handling cost
- Provide for employee convenience safety and comfort
- Maintain flexibility of arrangement operation

Reasons:

- New products
- Changes in demand
- Changes in product design
- New machines
- Bottlenecks
- Too large buffers
- Too long transfer times

Costs

- Space
- Movement of materials
- Production delays
- Spoilage of materials
- Labour dissatisfaction and risks
- Customer dissatisfaction due to poor service

Advantages:

- Increased Productivity
- Better quality
- Improved security

Layout Levels and Types

Levels:

- Inter departmental
- Intra departmental

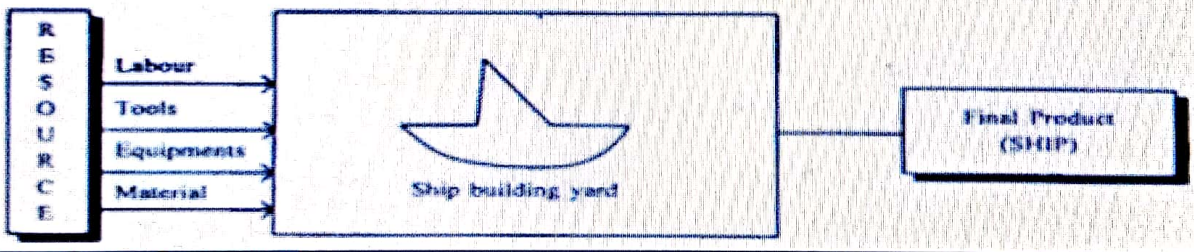
Types:

- Fixed position Layout
- Process Layout / Functional Layout
- Product Layout / Line Production
- Group Layout/ Cellular manufacturing

Layout Levels and Types

Fixed Product Layout

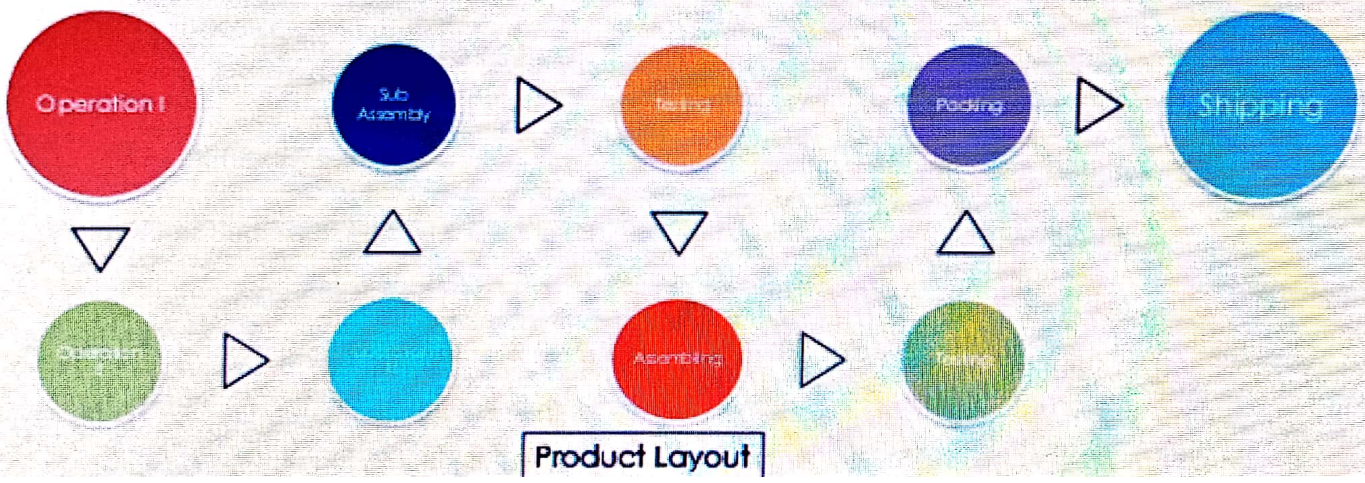
- When the product is too large
- Rather than taking the product to the processes, the processes are brought to the product
- Example: Shipbuilding, aircraft, construction Industry
- It is developed by locating workstations around the product
- Involves huge amount of logistics



Layout Levels and Types

Product Layout / Line Production (FLOW Shop)

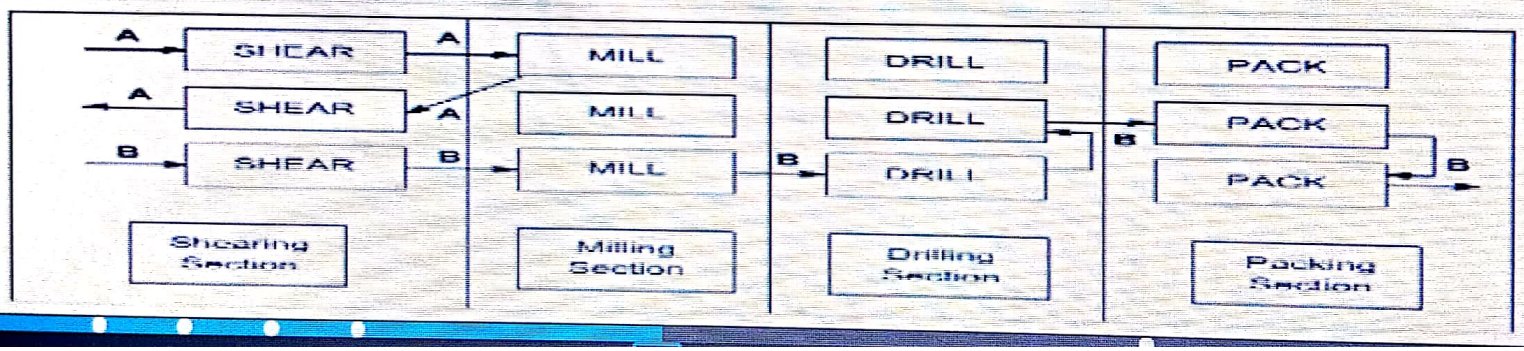
- Production line according to the processing sequence of the product
- High volume production and Short distances



Layout Levels and Types

Process Layout / Functional Layout (JOB Shop)

- All machines performing a particular process are grouped together in a processing department
- Low production volumes
- Rapid changes in the product mix
- High interdepartmental flow



Layout Levels and Types

Problems in Layout

Product Layout

- Too large to make quick change both in the product and process
- Inflexible

Process Layout

- Lack of communication
- Lack of appreciation
- Diversion of focus from product and company's goal
- Intervention required to solve conflicts between work centres and between people belonging to same work centre

Layout Levels and Types

Group Layout / Cellular Manufacturing / Group Technology

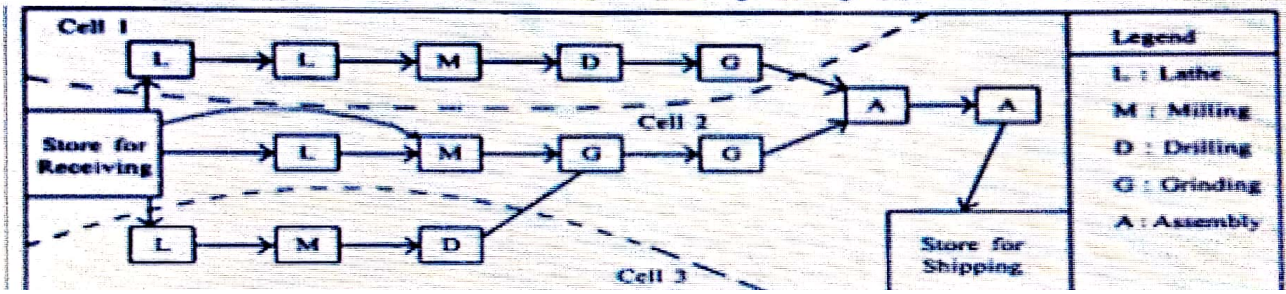
- Compromise between product layout and process layout
- Instead of functional centers there are groups of machines/short lines

CELL?

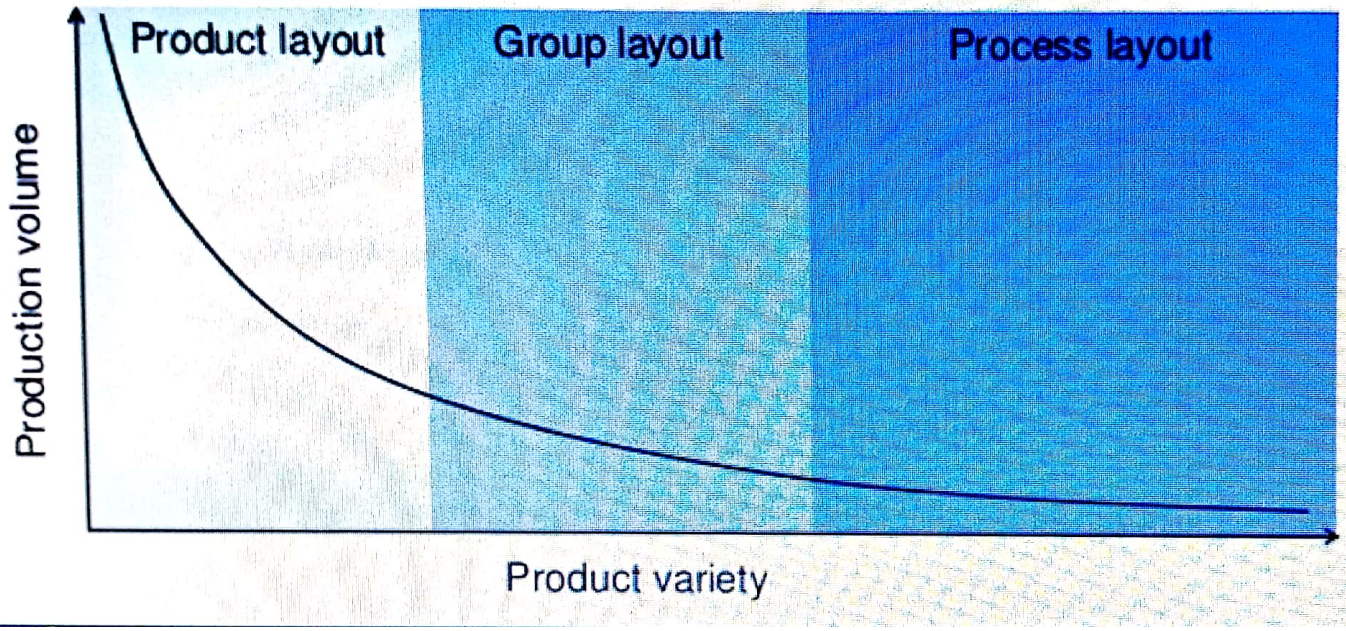
- Each of these short lines or groups of machines

Cellular Manufacturing?

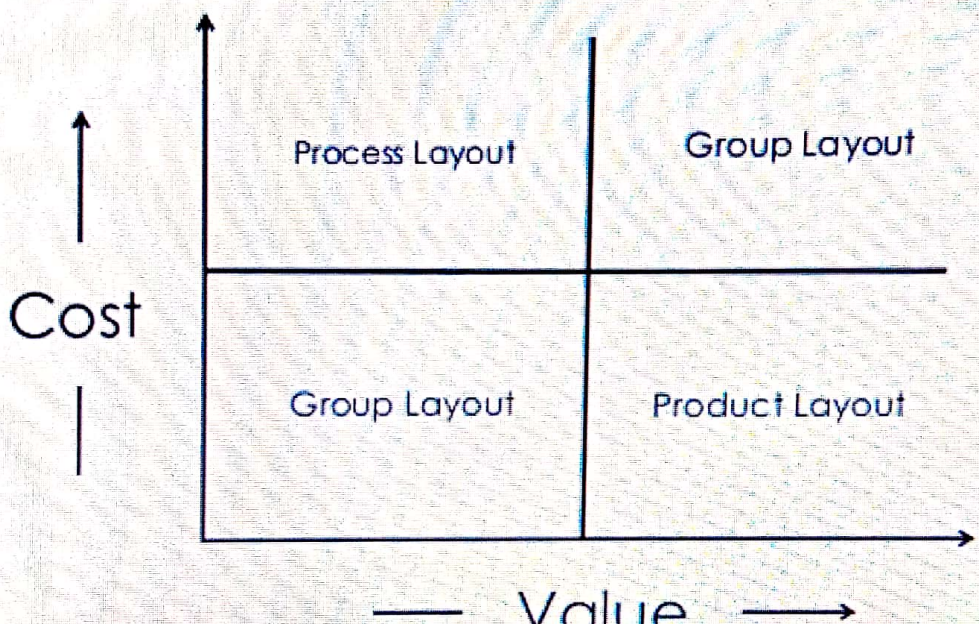
- Manufacturing consisting of several cells or using such group technology



Production Volume & Production Variety determines the type of layout



Cost Value Matrix



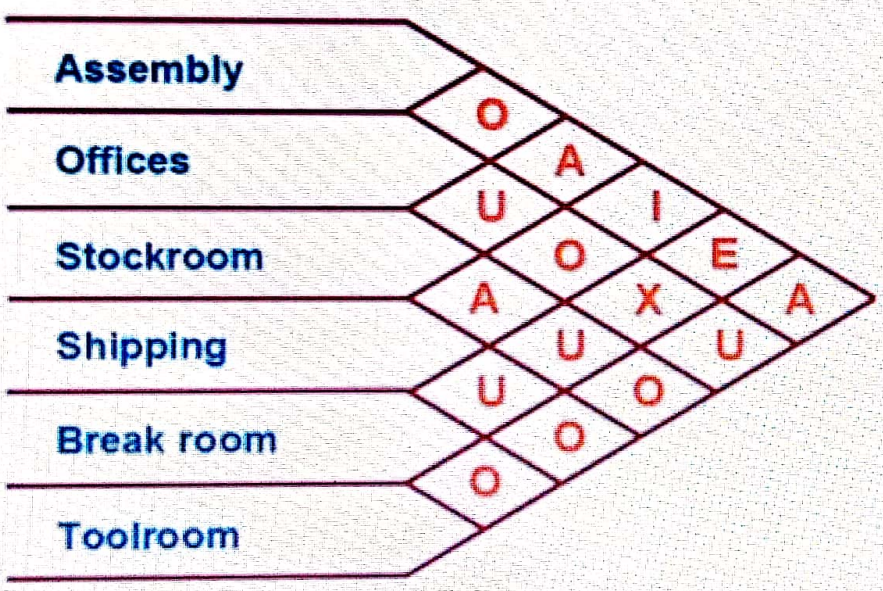
Activity Relationship Diagram

- To depict spatially the relationship between activities/processes/functions.
- Reflect the magnitude of material flow
- Pair of activities having greatest pair wise flow
- Pair of activities having smallest flow are of little importance
- Pair of activates having 'A' rating are adjacently located
- Pair having 'x' rating are located far apart
- Proximity is not the only way
- Communication – Video linking, intercoms

Rankings in terms of degree of Nearness/Closeness necessary

A	Absolutely essential
E	Especially necessary
I	Important
O	Ordinary
U	Unimportant
X	Not desirable

Muther Grid



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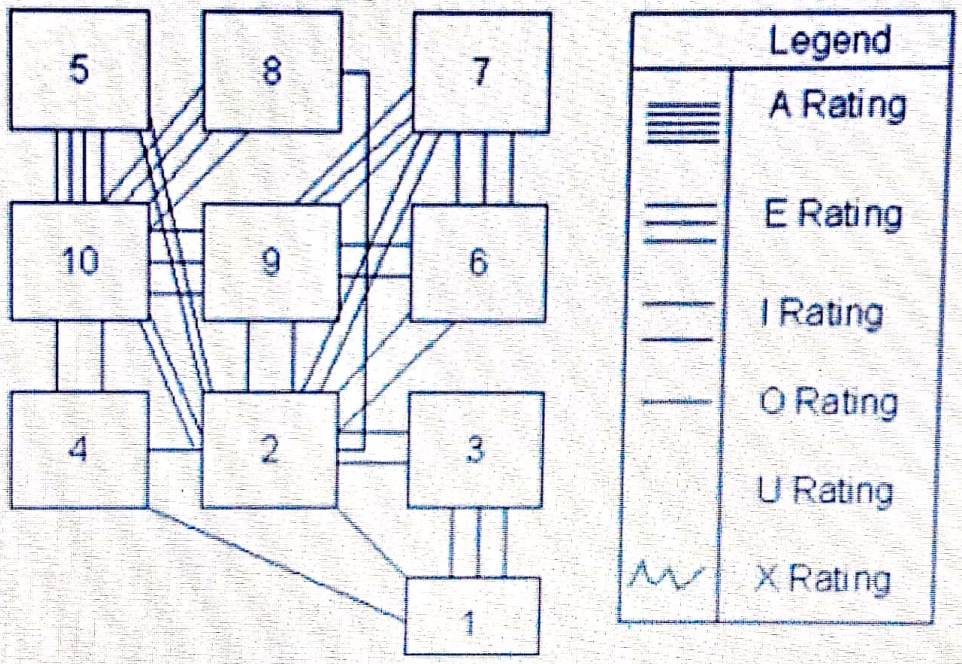
Activity Relationship Diagram



Computerised 3D Solutions

1. CRAFT - Computerized Relative Allocation of Facilities Technique :

- The best known of the heuristics approaches
- It attempts to minimize materials-handling cost by calculating cost, pair-wise interchanging departments, calculating more costs until a good solution is obtained.

2. CORELAP - Computerized Relationship Layout Planning:

- It attempt to maximize a nearness rating within the facility dimension constraint

3. ALDEP -Automated Layout Design Program

- It evaluates two layouts

4. PREP - Plant Re-layout and Evaluation Package

- It analyzes multilevel structures and is based on actual footage traveled by materials-handling