

Knowledge Sprint

## Operation Management : Facility Layout, Types of Layouts

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This article is on Facility Layout and Types of Layouts

It contains concepts like -

- Facility Layouts in Industries
- Types of Layouts in industries
- Plant Layout
- Process Layout
- Product Layout
- Combined Layout
- Fixed Position Layout



## Facility Layouts in Industries -

- Facility Layouts refers to represent the physical arrangement of a Equipments and different components of a factory at site location
- Here, the factory or production center may be small or large scale
- Simply to say, it is about how an industry will arrange of different equipments, raw materials storage location, inventory storage, tool rooms, maintenance rooms, worker amenities etc a factory locations
- Such arrangement layouts are called as “ Facility Layout” or “Plants Layouts”
- There are various types of layouts

## Types of Layouts in industries -

- Generally, there are 5 types of layouts that are widely in usage by industries
- They are -
  1. Plant Layout
  2. Process Layout
  3. Product Layout
  4. Combination Layout
  5. Fixed Position Layout
- Let us know study of each layout.



## 1. Plant Layout -

- It refers to arrangement of the various facilities and services of the plant within the area of the site selected previously.
- Plant layout design starts along with factory building
- All the facilities like equipments, raw materials, machinery, tools, futures, workers, etc. are placed at appropriate place.
- In deciding the place for equipment, the supervisors and workers are consulted and their due consideration are taken into account before they put into plant location
- However, consultation may not mandatory but consideration will help organization to have co-operation with employees while in production as it will create a multiplier effect on production
- Placing the equipment where it is not convenient for employees while being in production will impact the production levels

## Objectives of Good Plant Layout:

- Minimise hurdles in transportation of equipment or materials of production
- Adequate space for production and services
- Safe working conditions for employees
- Optimum use of available space
- Design should not hinder the process of production
- Design should be flexible enough for future expansion
- Design should focus on to minimise the movements of employees from one equipment to another equipment otherwise, it will create a loss of production hours



## 2. Process Layout:

- It is also referred as functional layout
- Process Layout focuses on keeping similar machines or similar operations at one place in layout
- Here, all similar functional Equipments are placed at one location and are grouped into one department
- Process Layouts are more suitable for industries, as its production of goods is done based on series of activities or process a site

Suitability of Process Layout -

This type of Layout is most preferable when -

- Several types of products need to be produced
- If volume of production of individual products is low
- When production of products needs continuous handling by mechanical methods
- If need of any intermittent production

## Advantages of Process Layout -

- Flexibility in production
- As equipments are grouped together supervisory is easy
- Reduction of Costs, as they are grouped together
- Production capabilities are increased
- Minimise movements of employees from one equipment to another equipment
- Helps an organisation to evaluate easily an employee at production levels, as employee works a more or less at constant location site and helps to determine his incentives for his/her production capabilities



## Disadvantages of Process Layout -

- More floor space is required to keep all equipment together
- Sometimes, it becomes difficult to control activities of production
- Generally, these are said to be utilised as WIP units, meaning Work in progress, where an production material comes as input here, it processes those and then sends that material to another equipment as input. In such cases, there are chances of Congestion at production site.
- Automatic material Handling becomes difficult
- Process Layout takes more time to finish or complete the product production at its stage
- It needs regular inspection or constant supervisory
- Effective cooperation and coordination is required at production site among employees

### 3. Product Layout -

- Product Layout refers to sequential arrangement of machines and components parts in one line based on sequence rules of production
- In simple terms, we can say that it is layout where a raw material moves in straight line from one equipment to another equipment in order to complete it as finished good
- Look at below picture to understand product Layout

Raw material → Machine 'A' → Machine 'B' → .... → Finished Product

- Product layout is also called as “ Line Type Layout” or “Straight Line layout”

#### Suitability of Product Layout

This layout is most preferable in below cases :

- If production is of continuous nature in mechanical methods
- If product layout needs a standardise for one or few products
- Applied in large volume of production
- Inspection on series of operations is less

## Advantages of Product Layout -

- As this type of layout prefers mechanical feeding into devices, it brings down cost of production
- Takes less time for production
- Considered as highly economical among layouts
- Better Production controls
- Small floor space for single machine
- Reduction in WIP ( work in progress) areas
- Does not require a Skillful human resources at site operations
- Better coordination
- Production process is simple in nature
- Workers movement completely low



## Disadvantages of Product layout -

- Lack of Flexibility in production operations
- Supervisory on operations are bit low
- Less Scope for expansion of this layout
- As the production is done in sequence manner, any break down of one equipment in the process, the production will be down or stopped until it is repaired or replaced
- Investment in this type is expensive, as production units need to keep a spare or extra equipment at handy to replace any equipment in case of failure while in production process

## 4. Combined Layout

- This type of layout is a combination of Product layout and Process layout
- Also called as “ Group Technology Layout” , or “ Hybrid Layout”
- Most of organizations use this type of layout in their production units
- For example, files, hacksaws, circular metal saws, wood saws etc.

### Suitability :

- When production of products are in various shapes and sizes
- The Equipments in layouts are arranged as per requirements of design of product and its final outcome
- Used when several items of products are produced but not in bulk

### Advantages and Disadvantages :

- This type of layout inherits the advantages and disadvantages from Product and process Layouts
- However, its usage in organizations purely based on its products produced for market and its business

## 5. Fixed Position Layout

- This type of layout is about transfer of productional resources like- human resources, or machines towards the production site which is already fixed and stable
- This layout is also called as Static Layout or fixed Location Layout
- Example - In hospital, the robotics (Equipments) are fixed in operation theatre and they are flexible to move as per doctor's directions while performing an surgery

### Suitability :

- Widely applicable to use if industry is of heavy type like in manufacturing of Locomotives, ships, aircrafts etc
- If manufacturing of few pieces of items
- Used where transfer of bulk volume of material is required

## Advantages of Fixed position Layout -

- Low investment for layout
- Helps to produce differentiated products ( ex- Aircrafts produced in various models)
- Very Flexible in nature, the workers get easily associated with it
- Production centers work can be designed in independent manner

## Disadvantages of Fixed Position layout -

- Transfer of machines from one place of another place, if required is a loss of time and costly
- These type of Layout need very expensive equipments for its operations
- High Skilled Professional are needed to operate the machines in layout
- Optimum utilization can be obtained in this layout, as the equipments are fixed in nature and its movements will be some constraints



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