

## PLANT LAYOUT

**Definition:** Plant layout refers to the arrangement of physical facilities such as machines, equipment, tools, furniture etc. in such a manner so as to have quickest flow of material at the lowest cost and with the least amount of handling in processing the product from the receipt of raw material to the delivery of the final product.

### Objectives of good Plant Layout:

- A well designed plant layout is one that can be beneficial in achieving the following objectives:
- Proper and efficient utilization of available floor space
- Transportation of work from one point to another point without any delay
- Proper utilization of production capacity.
- Reduce material handling costs
- Utilize labour efficiently
- Reduce accidents
- Provide for volume and product flexibility
- Provide ease of supervision and control
- Provide for employee safety and health
- Allow easy maintenance of machines and plant.
- Improve productivity

### TYPES OF LAYOUT:

There are mainly four types of plant layout:

#### (a) Product or line layout

#### (b) Process or functional layout

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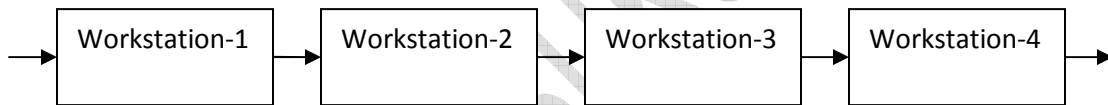
**(c) Fixed position or location layout**

**(d) Combined or group layout**

**PRODUCT OR LINE LAYOUT:**

In this type of layout the machines and equipments are arranged in one line depending upon the sequence of operations required for the product. It is also called as line layout. The material moves to another machine sequentially without any backtracking or deviation i.e the output of one machine becomes input of the next machine. It requires a very little material handling.

It is used for mass production of standardized products.



**Advantages of Product layout:**

- Low cost of material handling, due to straight and short route and absence of backtracking
- Smooth and continuous operations
- Continuous flow of work
- Lesser inventory and work in progress
- Optimum use of floor space
- Simple and effective inspection of work and simplified production control
- Lower manufacturing cost per unit

**Disadvantages of Product layout:**

- Higher initial capital investment in special purpose machine (SPM)

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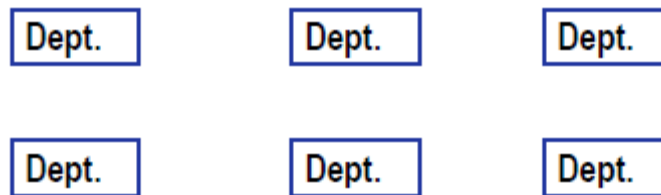
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- High overhead charges
- Breakdown of one machine will disturb the production process.
- Lesser flexibility of physical resources.

### PROCESS LAYOUT:

In this type of layout the machines of a similar type are arranged together at one place. This type of layout is used for batch production. It is preferred when the product is not standardized and the quantity produced is very small.



### Advantages of Process layout:

- Lower initial capital investment is required.
- There is high degree of machine utilization, as a machine is not blocked for a single product
- The overhead costs are relatively low
- Breakdown of one machine does not disturb the production process.
- Supervision can be more effective and specialized.
- Greater flexibility of resources.

### Disadvantages of Process layout:

- Material handling costs are high due to backtracking
- More skilled labour is required resulting in higher cost.

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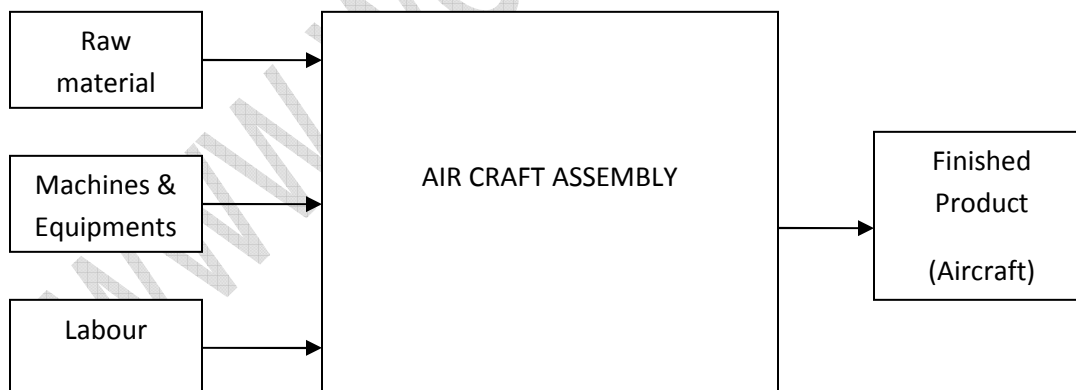
- Work in progress inventory is high needing greater storage space
- More frequent inspection is needed which results in costly supervision

### COMBINED LAYOUT:

- A combination of process & product layout is known as combined layout.
- Manufacturing concerns where several products are produced in repeated numbers with no likelihood of continuous production, combined layout is followed

### FIXED POSITION OR LOCATION LAYOUT:

Fixed position layout involves the movement of manpower and machines to the product which remains stationary. The movement of men and machines is advisable as the cost of moving them would be lesser. This type of layout is preferred where the size of the job is bulky and heavy. Example of such type of layout is locomotives, ships, boilers, generators, wagon building, aircraft manufacturing, etc.



### Advantages of Fixed position layout:

- The investment on layout is very small.

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- The layout is flexible as change in job design and operation sequence can be easily incorporated.
- Adjustments can be made to meet shortage of materials or absence of workers by changing the sequence of operations.

**Disadvantages of Fixed position layout:**

- As the production period being very long so the capital investment is very high.
- Very large space is required for storage of material and equipment near the product.
- As several operations are often carried out simultaneously so there is possibility of confusion and conflicts among different workgroups.

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