

- (a) Steam,
- (b) Gas,
- (c) Water,
- (d) Air or high pressure,
- (e) Electricity, and
- (f) Sewerage.

## **Plant Layout**

### **Meaning of Plant Layout**

**Plant layout** is the arrangement of machines, work areas and service areas within a factory. George R. Terry. **Plant layout** involves the development of physical relationship among building, equipment and production operations, which will enable the manufacturing process to be carried on efficiently.

#### Need of Plant Layout:

Many situations give rise to the problem of plant layout. Two plants having similar operations may not have identical layouts. This may be due to size of the plant, nature of the process and management's calibre.

#### **The necessity of plant layout may be felt and the problem may arise when:**

- (i) There are design changes in the product.
- (ii) There is an expansion of the enterprise.
- (iii) There is proposed variation in the size of the departments.
- (iv) Some new product is to be added to the existing line.
- (v) Some new department is to be added to the enterprise and there is reallocation of the existing department.
- (vi) A new plant is to be set up.

## **Importance of Plant Layout:**

The layout of a plant is quite important in view of the above definition but the importance of a layout may greatly vary from industry to industry.

### **The possibility of attaining the best possible layout is directly proportional to following factors:**

#### (i) The Weight, Volume or Mobility of the Product:

If the final product is quite heavy or difficult to handle involving costly material handling equipment or a large amount of labour, important consideration will be to move the product minimum possible e.g. boiler, turbines, locomotive industries and ship building companies etc.

#### (ii) Complexity of the Final Product:

If the product is made up of a very large number of components and parts i.e. large number of people may be employed for handling the movement of these parts from shop to shop or from machine to machine or one assembly point to another e.g. automobile industry.

#### (iii) The Length of the Process in Relation to Handling Time:

If the material handling time represents a appreciable proportion of the total time of manufacturing, any reduction in handling time of the product may result in great productivity improvement of the industrial unit e.g. Steam Turbine Industry.

#### (iv) The Extent to which the Process Tends towards Mass Production:

With the use of automatic machines in industries for adopting mass production system of manufacturing the volume of production will increase. In view of high production output, larger percentage of manual labour will be engaged in transporting the output unless the layout is good.

## **Objectives of Good Plant Layout:**

A good rather an optimum layout is one which provides maximum satisfaction to all concerned i.e. shareholders, management employees and consumers.

### **The objectives of a good layout are as follows:**

(i) Should provide overall satisfaction to all concerned.

(ii) Material handling and internal transportation from one operation to the next is minimized and efficiently controlled.

(iii) The production bottle necks and points of congestions are to be eliminated so that input raw materials and semi-finished parts move fast from one work station to another.

(iv) Should provide high work in process turnover.

- (v) Should utilize the space most effectively; may be cubical utilization.
- (vi) Should provide worker's convenience, promote job satisfaction and safety for them.
- (vii) Should avoid unnecessary investment of capital.
- (viii) Should help in effective utilization of labour.
- (ix) Should lead to increased productivity and better quality of the product with reduced capital cost.

## **Types of Plant layout**

### **Four Main Types of Plant Layout**

1. Product or Line Layout
2. Process or Functional Layout.
3. Fixed Position Layout.
4. Combination type of Layout.

#### **1. Product or Line Layout**

If all the processing equipment and machines are arranged according to the sequence of operations of the product, the layout is called product type of layout. In this type of layout, only one product of one type of products is produced in an operating area. This product must be standardized and produced in large quantities in order to justify the product layout.

The raw material is supplied at one end of the line and goes from one operation to the next quite rapidly with a minimum work in process, storage and material handling. Fig. 8.3 shows product layout for two types of products A and B.