

## **PLANT LAYOUT**

The location of the plant can have a crucial effect on the overall profitability of a project, and the scope for future expansion. Many factors must be considered when selecting a suitable plant site. The principal factors are:

- Location, with respect to the marketing area
- Raw material supply
- Transport facilities
- Availability of labor
- Availability of suitable land
- Environmental impact and effluent disposal
- Local community consideration
- Climate
- Political and strategic consideration

### **Plant layout:**

The economic construction and operation of a process unit will depend on how well the plant equipment specified on the process flow sheet and laid out.

The principal factors to be considered are:

- Economic consideration: construction and operation cost.
- The process requirement
- Convenience of operation
- convenience of maintenance
- Safety
- Future expansion
- Modular construction

### **Costs:**

The cost of construction can be minimized by adopting a layout that gives shortest run of connecting pipes between equipment, and adopting the least amount of structural

steel work. However, this will not necessarily be the best arrangement for operation and maintenance.

**Process requirement:**

All the required equipments have to be placed properly within process. Even the installation of the auxiliaries should be done in such a way that it will occupy the least space. The plant has to be closely located to the raw material resources.

**Operation :**

As the benzene plant handles toxic materials, the operation should be carried out with full safety precautions. Equipment that needs to have frequent operation should be located convenient to the control room. Valves, sample points, and instruments should be located at convenient position and height. Sufficient working space and headroom must be provided to allow easy access to equipment.

**Maintenance :**

Heat exchangers need to be sited so that the tube bundles can be easily withdrawn for cleaning and tube replacement. Vessels that require frequent replacement of catalyst or packing should be located on the outside of buildings. Equipment that requires dismantling for maintenance, such as compressors and large pumps, should be placed under cover.

**Safety :**

As benzene is highly inflammable, safety becomes a priority. Blast walls may be needed to isolate potentially hazardous equipment, and confine the effects of an explosion. At least two escape routes for operator must be provided from each level in the process building.

**Plant expansion :**

Equipment should be located so that it can be conveniently tied in with any future expansion of the process. Space should be left on pipe alleys for future needs, service pipes over-sized to allow for future requirements.

**Modular construction:**

In recent years, there has been a move to assemble sections of the plant at the manufacturer site. These modules will include the equipment, structural steel, piping and instrumentation. The modules then transported to the plant site, by road or sea.

**Marketing area :**

As the plant is high volume, low cost production unit, it should be located near potential markets.