

## **PLANT LAYOUT**

The theoretical minimum space a plant can occupy is the total volume of its various components. Various constraints prevent the attachment of this minimum. Such constraints include allowing adequate clearness for access during operation, maintenance and construction and to allow safe operation. In general it is true to say that most economical plant layout is that in which spacing of main equipment items is such that it minimizes interconnecting pipe network and structural steel work. Normally, equipment should be laid out in a sequence to suit the process flow but exceptions to this arise from the desirability to group certain item such as tanks or pumps or perhaps to isolate hazardous operations. Equipment should be laid out to give maximum economy of pipe work and supporting steel, consistent with access and safety requirements Scope for future expansion should always be there.

<b>STAGES OF DEVELOPMENT OF LAYOUT</b>	<b>USEFUL TECHNIQUE</b>
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<p>1)Layout begins with collection and assessment of flow sheets(which must show materials of construction ,size of pipe work and suggested elevations),equipment data sheets, results of survey incorporating relevant data on site boundaries, topography, soil structure, weather conditions, utility terminals and site access points and codes of practice.</p>	<p>1)<b>Critical examination</b> is used to question the elevation layout assumptions made in flow sheet. This method enables the objectives and constraints to be defined. <b>Techniques of correlation and compatibility</b> are used to sort and list the various alternatives.</p>
<p>2)The cost of each elevation alternative is examined for differences only, e.g. in the number of plane items needed to achieve the objective, in the material transfer costs such as piping elevators, power consumption.</p>	<p><b>Simple elevation drawings</b> are prepared for alternatives showing heights and relative positions of plant items only. No structures or floor levels are added yet as these may depend on plan layout</p>
<p>3)Plant items and buildings are laid out in plan, ensuring that all layout considerations (e.g. relation to operation, maintenance, safety consideration, environments and expansion) are applied .A costing is made of each plan layout similar to the elevation studies</p>	<p>3)<b>Critical examination</b> is used to question the elevation layout assumptions made in flow sheet. This method enables the objectives and constraints to be defined. <b>Techniques of correlation and compatibility</b> are used to sort and list the various alternatives.</p>
<p>4)The related plan and elevation layouts are now constrained to determine possible positions of supporting and access structures, to study civil relaxation of earlier constraints</p>	<p><b>Layout analogues</b> such as cut outs help in the visualization of the layout and in examination of plot size and external constraints. The layout alternatives are presented by <b>block models</b>. At this stage these help people to visualize the non-quantified operational and safety aspects</p>

<p>5)Final alternatives are again costed for differences and a solution is made.</p>	<p>5)The <b>final layout</b> is drawn.(option may still be left open for detailed study.)</p>
<p>6)Preparation of piping models is now commenced .These are further used to optimize pipewok. A check should be made that all constraints are obeyed particularly those for operations.</p>	<p>6)<b>Piping models</b> are now prepared.</p>

**Table 8.1 Development Stages Of Plant Layout**