Orthographic Projection:-Projectors are parallel to each other and perpendicular to the plane of projection.

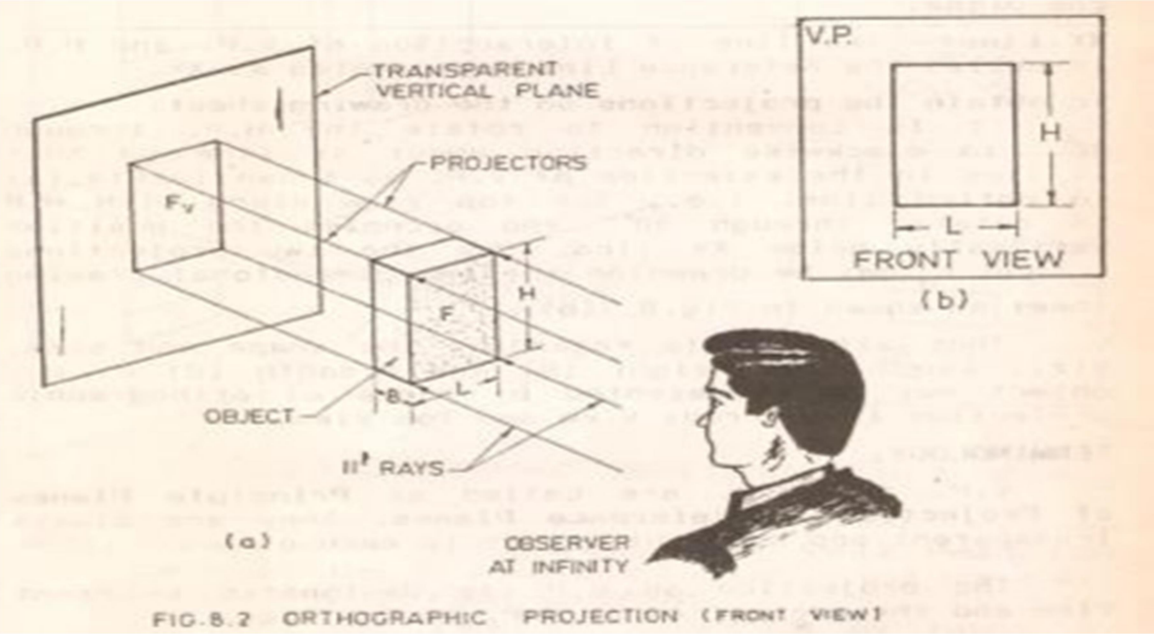


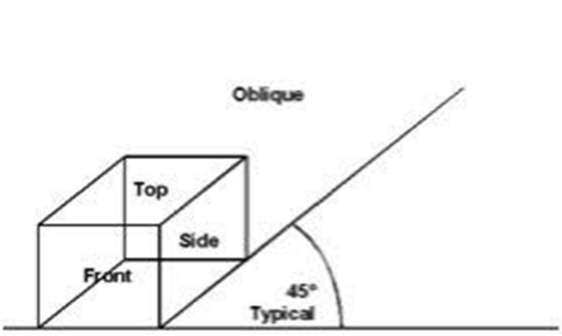
FIG. 8.2 ORTHOGRAPHIC PROJECTION (FRONT VIEW)

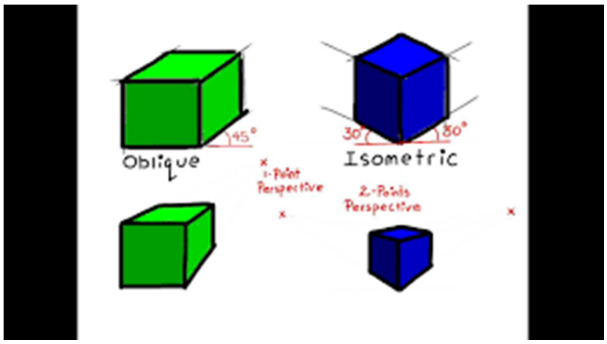
Oblique projection

An oblique projection is a simple type of graphical projection used for producing pictorial, two-dimensional images of three-dimensional objects:

- it projects an image by intersecting parallel rays (projectors)
- From the three-dimensional source object with the drawing surface (projection plan).

In both oblique projection and orthographic projection, parallel lines of the source object produce parallel lines in the projected image.

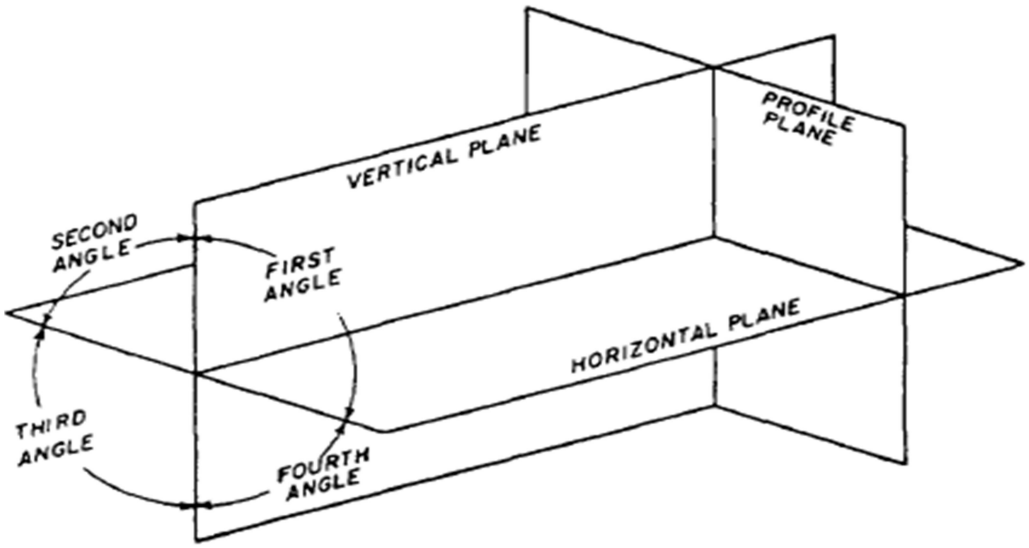




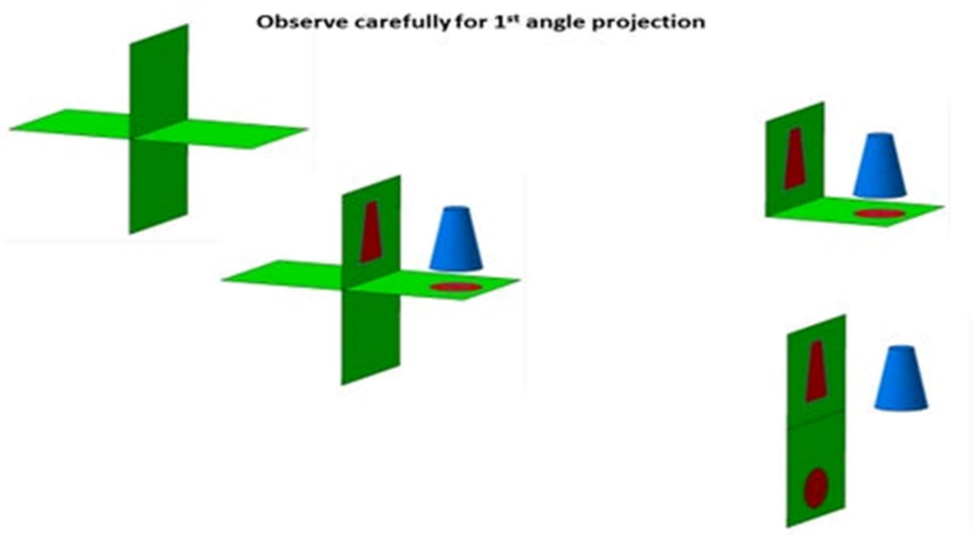
(Pictorial View – A pictorial view is a means of representing a three- dimensional object so as to reveal all three directions (axes) of space in one picture.)

Terminology: - Multi- view drawing are made on three mutually perpendicular plane namely; vertical, horizontal and profile plane. These planes are called references plane (principal plane).

1. Vertical plane – VP
2. Horizontal plane – HP
3. Profile plane – PP
4. Front view – FV
5. Top view – TV
6. Side view – SV



(i) **First angle projection**



Projection of solid -

Solids A 3-D object having length, breadth and thickness and bounded by surfaces which may be either plane or curved, or combination of the two.

Classified under two main headings

Polyhedron

Solids of revolution

Regular polyhedron – solid bounded only by plane surfaces (faces). Its faces are formed by regular polygons of same size and all dihedral angles are equal to one another.

Other polyhedra – when faces of a polyhedron are not formed by equal identical faces, they may be classified into prisms and pyramids.

Pyramids – a polyhedron formed by a plane surface as its base and a number of triangles as its side faces, all meeting at a point, called vertex or apex.

Axis – the imaginary line connecting the apex and the center of the base.

Inclined/slant faces – inclined triangular side faces.

Inclined/slant/longer edges – the edges which connect the apex and the base corners.

Right pyramid – when the axis of the pyramid is perpendicular to its base.

Oblique pyramid – when the axis of the pyramid is inclined to its base.

Solids of revolution – when some of the plane figures are revolved about one of their sides – solids of revolution is generated.

Cylinder – when a rectangle is revolved about one of its sides,

Cone – when a right triangle is Sphere – when a semi-circle is revolved about one of its sides, is revolved about one of its the other parallel side generates a cylinder.

Cone – when a right triangle is revolved about one of its sides, the hypotenuse of the right triangle generates a cone. is revolved about one of its diameter, a sphere is generated..

Oblique cylinder – when a parallelogram is revolved about one of its sides, the other parallel side generates a cylinder.

Oblique cone

Truncated and frustums of solids – when prisms, pyramids, cylinders are cut by cutting planes, the lower portion of the solids (without their top portions) are called, either truncated or frustum of these solids.

Projections of solids placed in different positions –

Projections of solids placed in different positions the solids may be placed on HP in various positions

The way the axis of the solid is held with respect to HP or VP or both –
(1) Perpendicular to HP or VP
(2) Parallel to either HP or VP and inclined to the other
(3) Inclined to both HP and VP
Axis of the solid perpendicular to HP - A solid when placed on HP with its axis perpendicular to it, then it will have its base on HP. This is the simplest position in which a solid can be placed. When the solid is placed with the base on HP position, in the top view, the base will be projected in its true shape. Hence, when the base of the solid is on HP, the top view is drawn first and then the front view and the side views are projected from it. O only o n e p position n in w hic h a cylinder r o r a c o n e m a y b e placed with its b a s e o n H P.

Axis of the solid perpendicular to VP - When a solid is placed with its axis perpendicular to VP, the base of the solid will always be perpendicular to HP and parallel to VP. Hence in the front view, base will be projected in true shape Therefore, when the axis of the solid is perpendicular to VP, the front view is drawn first and then the top and side views are drawn from it.

Axis of the solid inclined to HP and parallel to VP –
(1) When a solid is placed on HP with its axis inclined to HP, the elemental portion of the solid that lies on HP depends upon the type of the solid.
(2)When a prism is placed on HP with its axis inclined to it, and then it will lie either on one of its base edges or on one of its corners on HP.

(3) When a pyramid is placed on HP with its axis inclined to HP, then we will have one of its base edges on HP or one of its base corners on HP or one of its slant edges on HP or one of its triangular faces on HP or an apex on HP.