PROJECTION OF STRAIGHT LINES

A straight line is the shortest route to join any two given points. It is a one-dimensional object having only length (l).

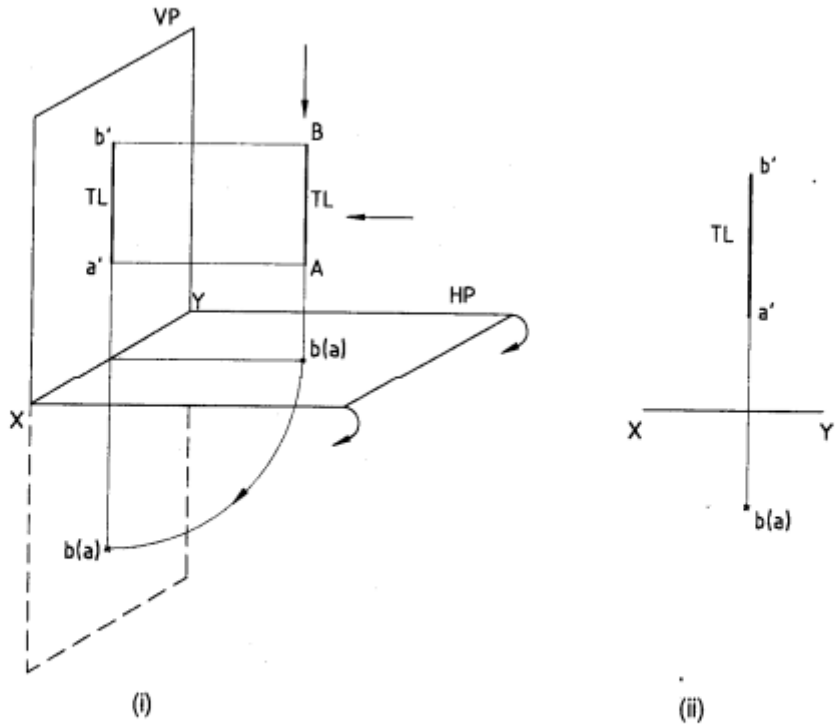
The projection of straight line are obtained by joining the top and front views of the respective end points of the line. The actual length of the straight line is known as true length (TL).

A straight line is placed with reference to the planes of projections in the following positions.

1. *Line perpendicular to HP and parallel to VP.*
2. *Line perpendicular to VP and parallel to HP.*
3. *Line parallel to both HP and VP.*
4. *Line inclined to HP and parallel to VP.*
5. *Line inclined to VP and parallel to HP.*
6. *Line inclined to both HP and VP.*

In first angle projection method, the line is assumed to be placed in the first quadrant. The projections of the line in the above mentioned positions are discusses below.

Projection of a Line kept Perpendicular to HP and Parallel to VP

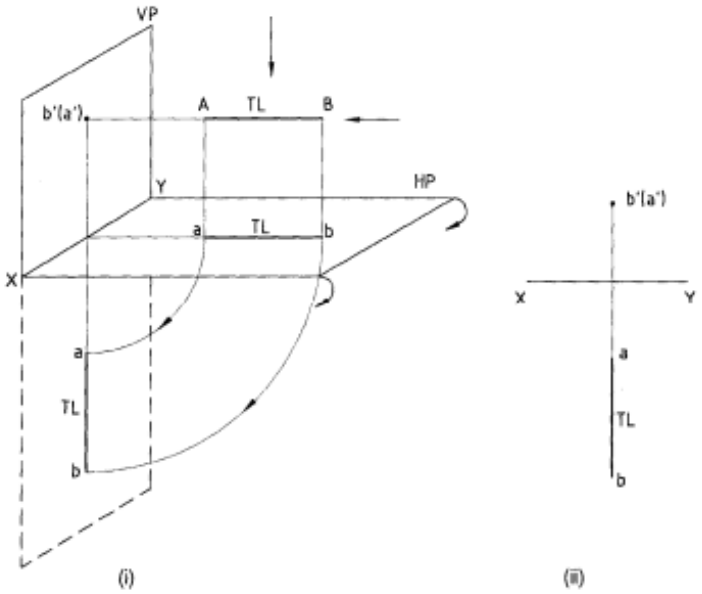


Consider a straight line AB kept perpendicular to HP and parallel to VP Fig.(i). Its front view is projected onto VP which is s line having true length. The top view is projected onto HP which is a point one end b of which is visible while the other end a is invisible and is enclosed within ( ).

Now the HP is rotated in the clockwise direction through 90^0 and is obtained in the vertical position. The projections obtained are seen as given in Fig. It is drawn with reference to the XY line as follows.

1. Draw the XY line.
2. Draw the front view a'b'. which is a line perpendicular to XY and having true length (TL).
3. Projected the top view ab. The end b is visible and the invisible end a is marked inside ( ).

Projection of a Line kept Perpendicular to VP and Parallel to HP

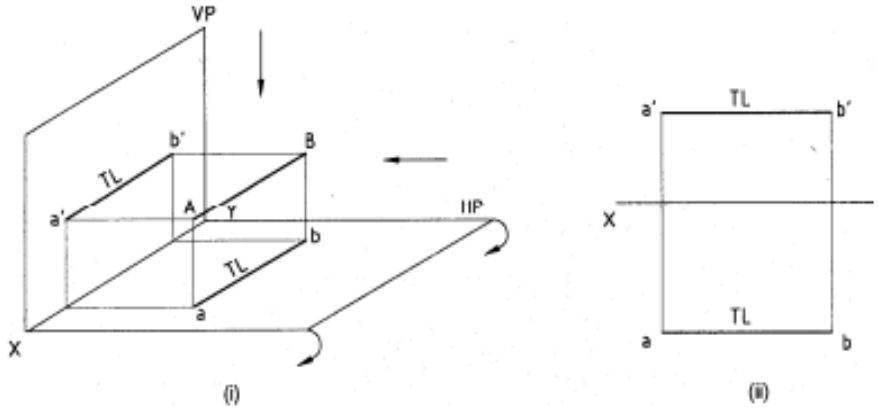


Consider a straight line AB kept perpendicular to VP and parallel to HP Fig.(i). Its top view is projected onto HP which is a line having true length (TL). The front view is projected onto VP which is point, the end b' of which is visible and the other end a' is invisible which is shown enclosed in( ).

Now the HP is rotated in the clockwise direction through 90^0 and is obtained in the vertical position. The projections obtained are seen as given in Fig.(ii). It is drawn with reference to the XY line as follows.

1. Draw the XY line.
2. Draw the top view ab, a line perpendicular to XY and having true length (TL).
3. Projected the front view a'b'. The end b' is visible ad the invisible end a' is marked inside ( ).

Projection of a Line kept Parallel to Both HP and VP



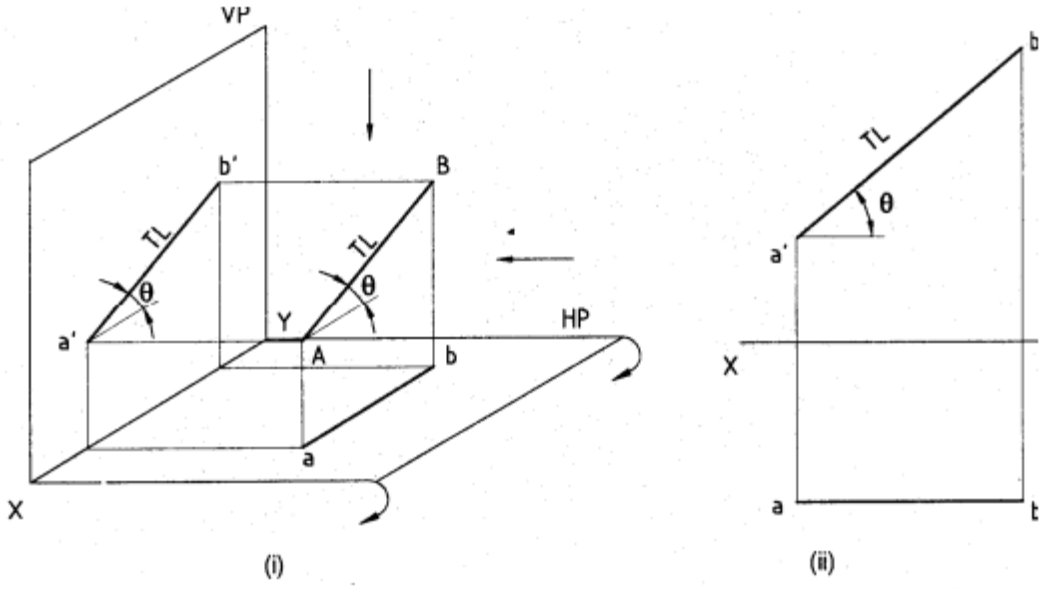
Consider a straight line AB kept parallel to both HP and VP Fig.(i). Its front view is projected onto VP which is a line having true length (TL). The top view is projected onto HP which is also a line having true length.

Now the HP is rotated in the clockwise direction through an angle of 90^0 and is obtained in the vertical position. The projections obtained are seen as given in Fig.(ii). It is drawn with references to the XY line as follows:

1. Draw the XY line.
2. Draw the front view a'b', a line parallel to XY and having true length (TL)
3. Project the top view ab which is also a line parallel to XY having true length (TL).

Projection of a Line kept inclined to HP and Parallel to VP

Consider a straight line AB kept inclined to HP and parallel to VP Fig.(i). Its front view is projected onto VP which is an inclined line at an angle θ to XY and having true length (TL). The top view is projected onto HP which is also a line but smaller than the true length and parallel to XY. The inclination of the line with HP is always represented by the symbol θ.



Now the HP is rotated in the clockwise direction through 90^0 and is obtained in the vertical position. The projections obtained are seen as given in Fig.(ii). It is drawn with reference to the XY line as follows:

1. Draw the XY line.
2. Draw the front view a'b', a line inclined at an angle θ to XY having true length (TL).
3. Project the top view ab which is also a line parallel to XY and smaller than true length.

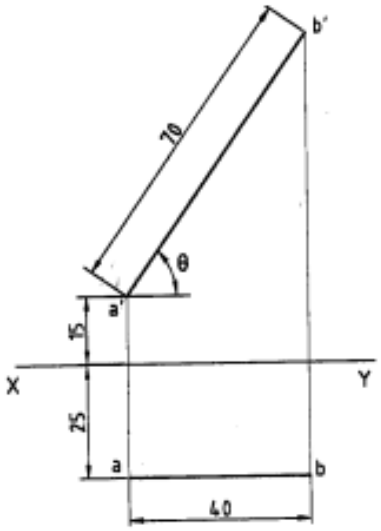
EXAMPLE

A line AB 70 mm long has its end A 15 mm above HP and 25 mm in front of VP. Its top view (plan) has a length of 40 mm. Draw its projections and find the inclination of the line with HP.

SOLUTION

The projections of the line are drawn with reference to the XY lien as follows:

1. Mark the projections of end A by considering it as a point. Its front view a' is 15 mm above XY and top view a is 25 mm below XY.
2. The top view of the line ab is drawn parallel to XY to the given length of 40 mm.
3. Draw a vertical line (projector) from b.
4. Using true length 70 mm as radius and a' as centre, mark a point in the vertical line to get b'.
5. The inclination of a'b' with XY is measured to get θ.



ANSWER

θ = 55°