

Chapter-IV

Auxiliary views

Definition: an orthographic view which is projected onto any plane other than the frontal, horizontal, or profile plane, is called an **auxiliary view**.

A **primary auxiliary view** is a view projected to a plane perpendicular to one of the three principal planes (top, front, or side) and inclined to the other two planes. A view projected from a primary auxiliary view on a plane inclined to all three principal planes of projection is referred to as a **secondary auxiliary view**.

4.1 Purpose Auxiliary Views

The purpose of an auxiliary view is to **show the true shape and size of an inclined/oblique** surface of an object since inclined surfaces are not parallel to any planes in multi view projections and appear foreshortened.

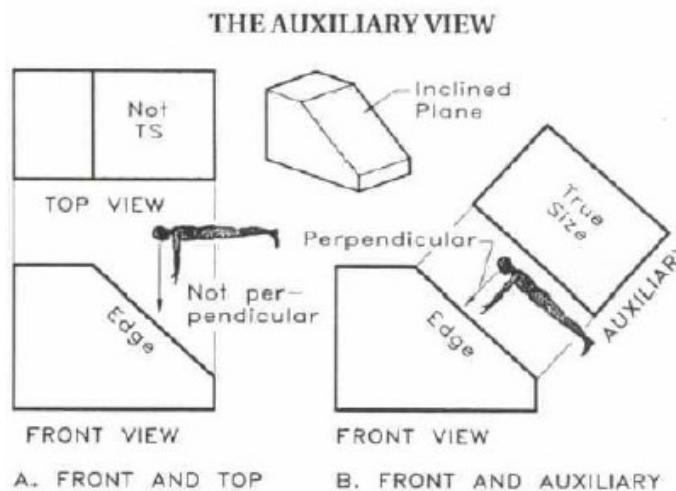


Fig. 4.1 Auxiliary view projection

The method of projecting the image of an object to an auxiliary plane is identical to the method used for projecting an image to one of the principal planes; that is, the projectors are parallel and the observer is positioned an infinite distance away from the object.

To draw a primary auxiliary view, the following procedures are used:

1. Draw two adjacent principal views, one of which must show the inclined surface as an edge (fig.4.2 is used as a reference).

2. Lightly draw a reference line (AB) parallel to the edge view of the inclined plane.
3. Lightly draw a reference line (CD) between the two principal views. Use AB and CD to locate points in the auxiliary view.
4. Draw projectors from the inclined edge rotating reference line AB parallel with the inclined surface. These projectors are perpendicular to the inclined edge and the reference line as shown in figure.4.2
5. Using a compass or dividers, transfer distances from reference line CD to the various points in the side view.
6. Darken all object outlines of the primary auxiliary view and erase all projectors and reference lines. The completed primary auxiliary view shows the true shape of the inclined surface.

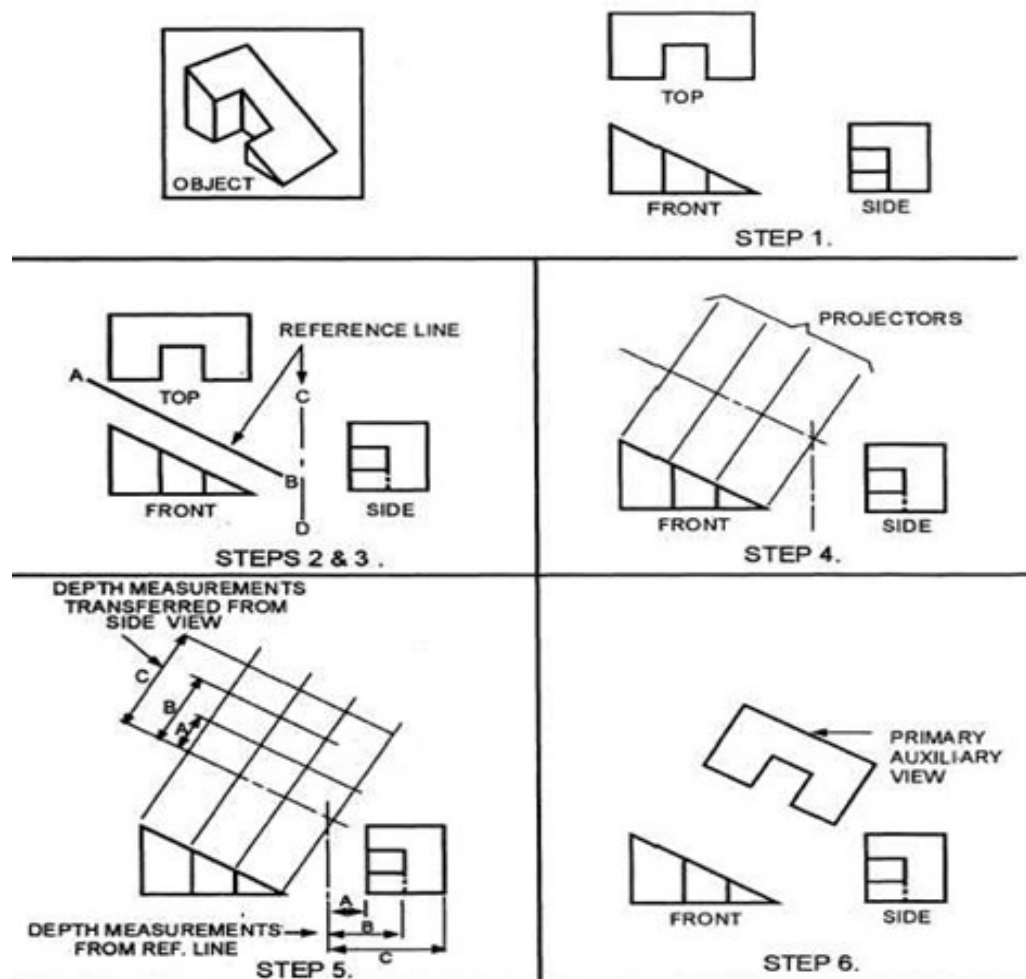


Fig. 4.2 Drawing an Auxiliary View

4.2 Type of auxiliary views:

- **Complete auxiliary view (Full auxiliary view):**

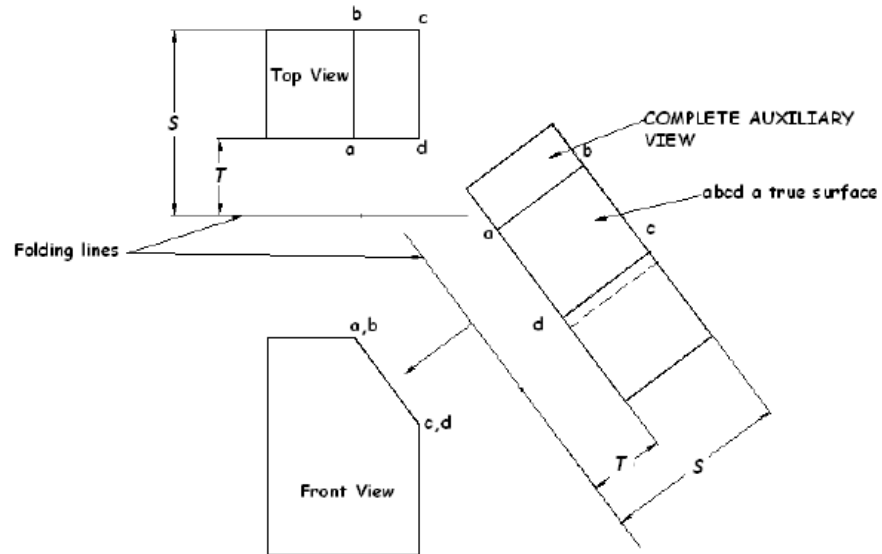


Fig. 4.3 Complete Auxiliary view projection

➤ **Partial auxiliary view:**

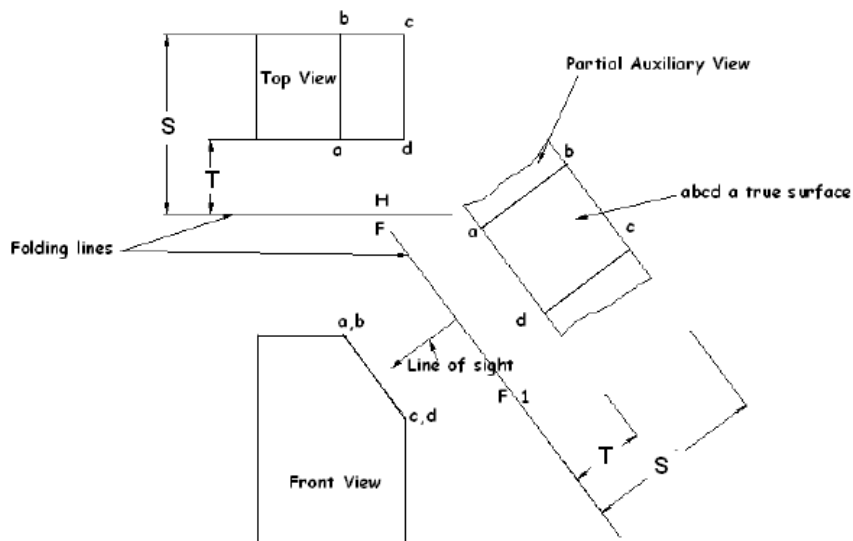


Fig. 4.4 Partial Auxiliary View projection

4.3 Classifications of Auxiliary views:

According to the principal dimensions of an object having inclined surfaces, Auxiliary views are classified in to three such as;

- 1. Depth auxiliary view:** the view projected from the front view showing the depth of an object. An infinite number of depth auxiliary views can be shown.

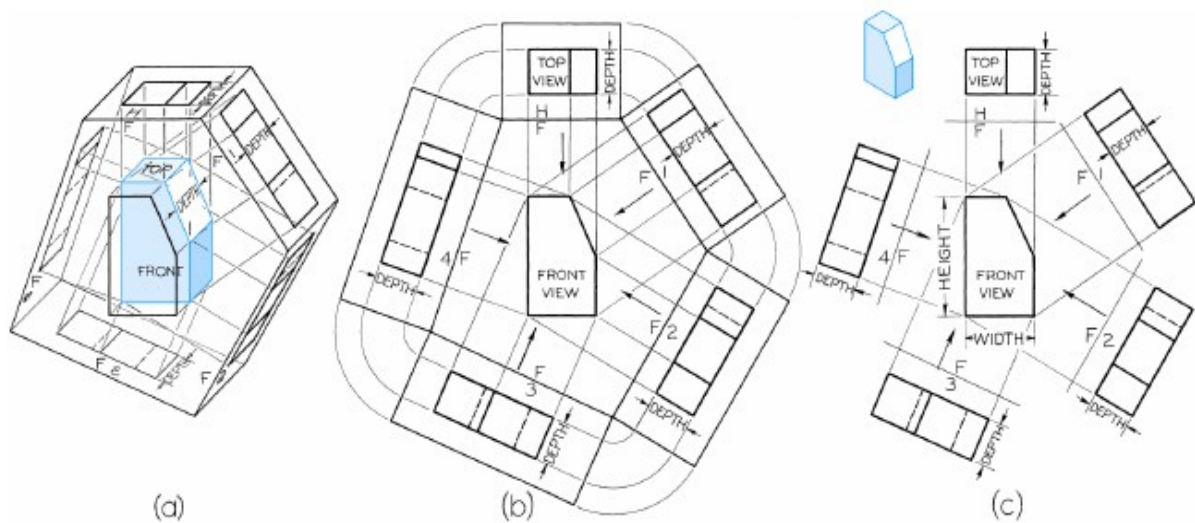


Fig. 4.5 depth auxiliary view projection

In the depth auxiliary views shown, the arrows indicate the directions of sight for the several views, and the projection lines are respectively parallel to these arrows. Actually, the projection lines determine the direction of sight; hence the arrows may not be needed.

2. Height Auxiliary views: views projected from the top view showing the height of the object. An infinite number of auxiliary views can be assumed perpendicular to, and Hinged to, the horizontal plane of projection.

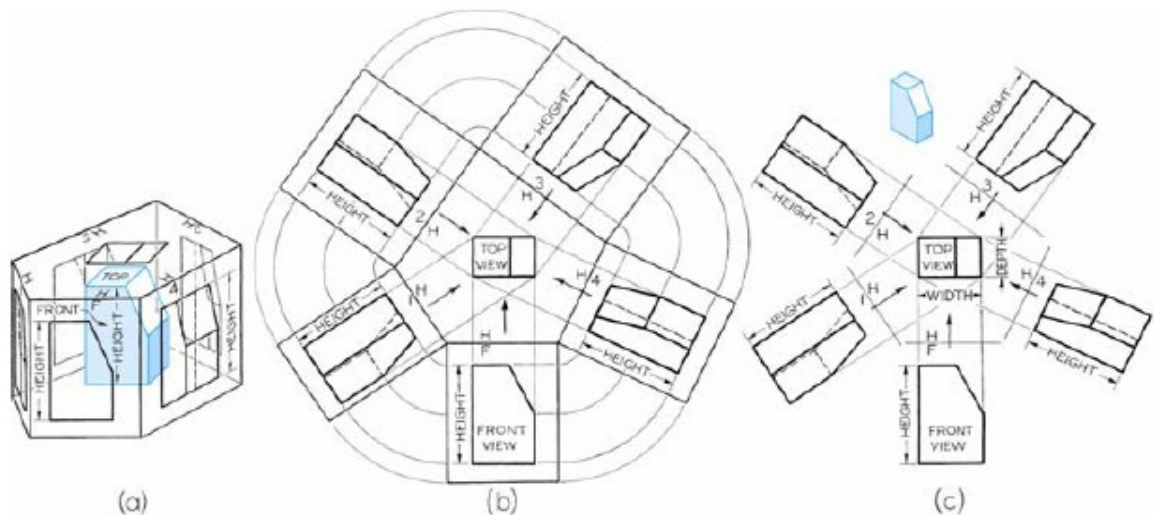


Fig. 4.6 Height auxiliary view projection

3. Width Auxiliary views: view projected from either sides of the object.

Note that in the right-side view from, which the auxiliary views are projected, the only dimensions not shown is width auxiliary view.

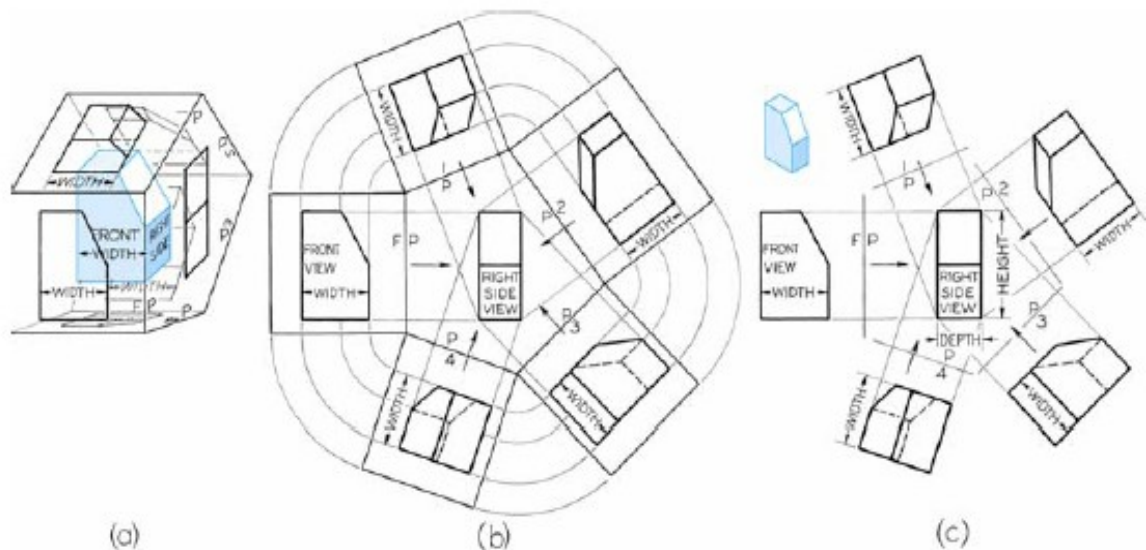


Fig. 4.7 Width Auxiliary view projections

More Examples:

- 1) We can use the glass box technique by adding another plane and project this surface unto it. By doing so, we can show the slanted surface's true shape and size.

NOTE: The new glass plane is parallel to the surface it describes just like

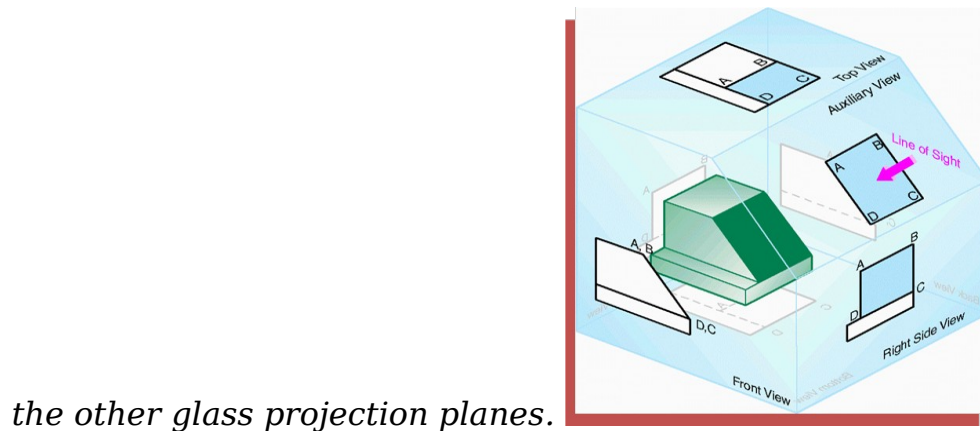


Fig. 4.8 plane projections on glass box

Just the way we unfold the glass box to expose all of the principle views.....

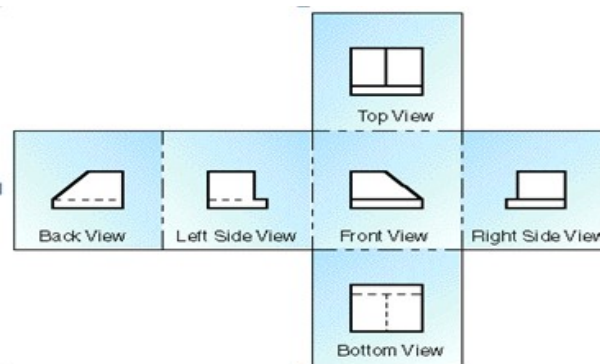


Fig. 4.9 six principal views of glass box

We see that the new auxiliary view will be projected from the front view where the surface appears as an edge.

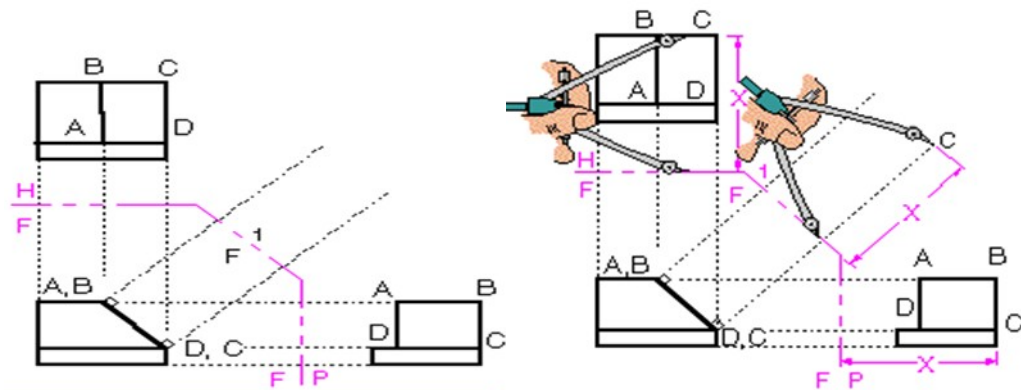


Fig. 4.10 way of creating an Auxiliary View

Transfer the distance from PP to point C in the TOP view...

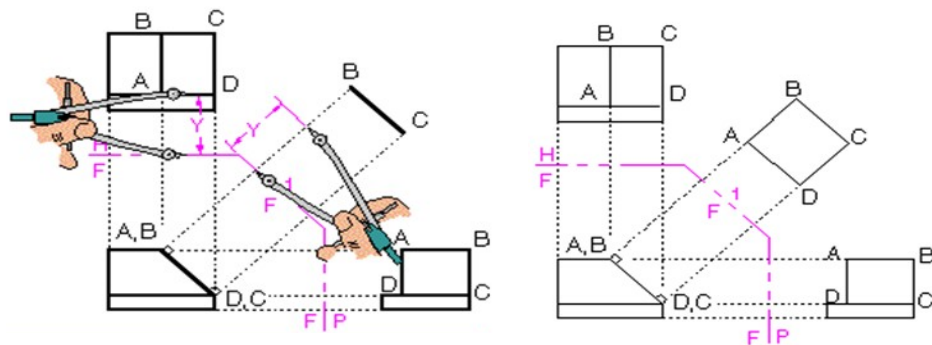


Fig. 4.11 How to transfer different distances from the principal views to form A.V

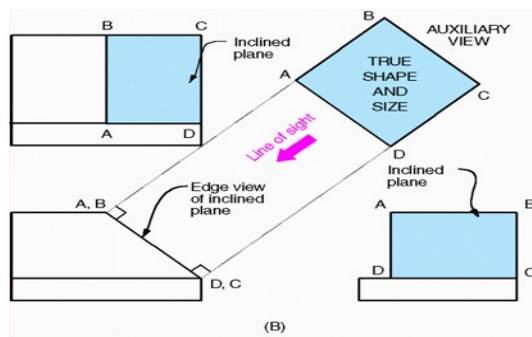


Fig. 4.12 Creation of an Auxiliary View

2) Create an Auxiliary View from the following two principal views.

Step 1 - Identify both the Edge View and the Reference Dimension

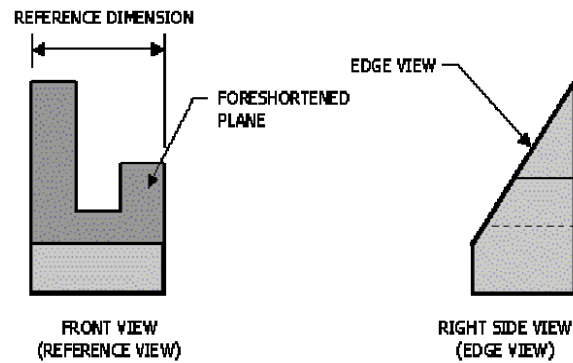


Fig. 4.13 Given views

Step 2 - Placement of Reference Line

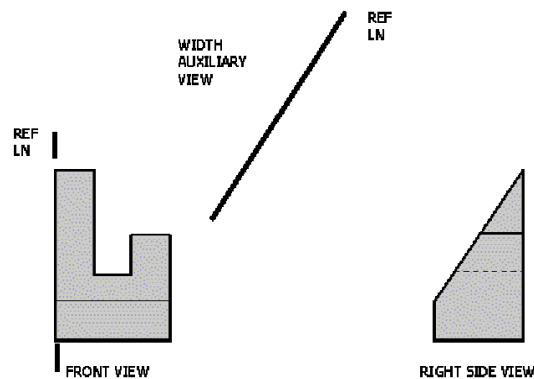


Fig. 4.14 Drawing a reference line parallel to oblique surface

Step 3 - Project all Points

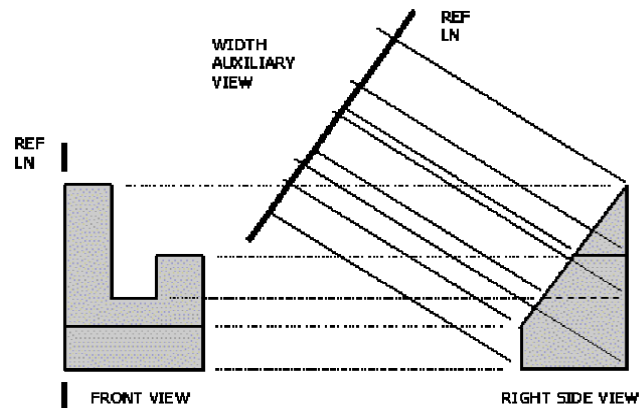


Fig. 4.15 Projecting all points perpendicular to the reference line

Step 4 - Transfer Points

NOTE: All measurements must be made perpendicular to the Reference Line.

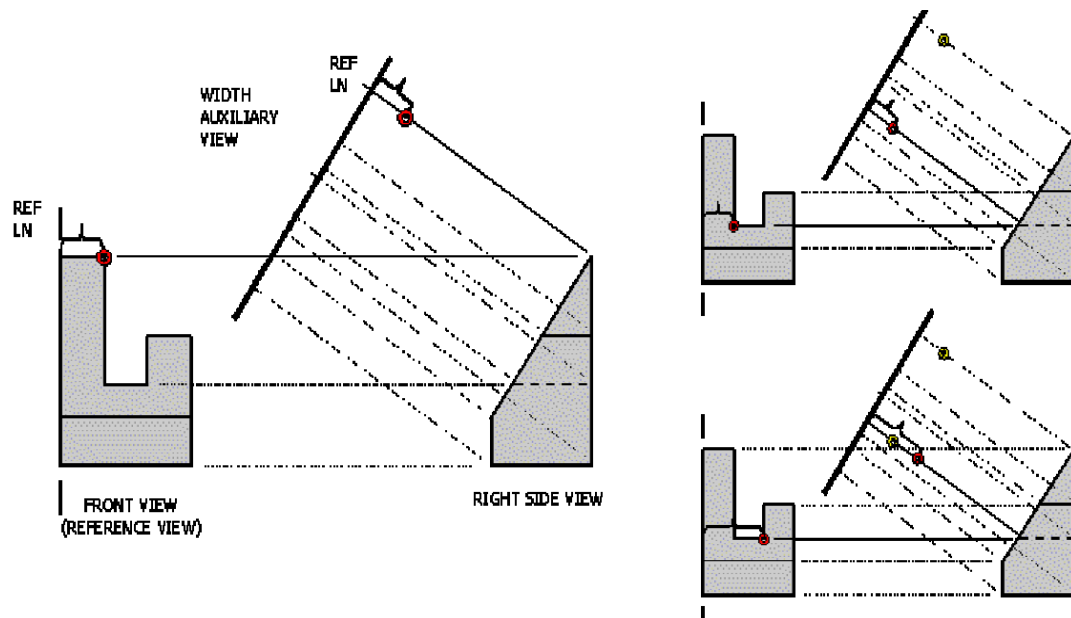


Fig. 4.16 Transferring all points from the given principal views

Step 5 - Connect Points

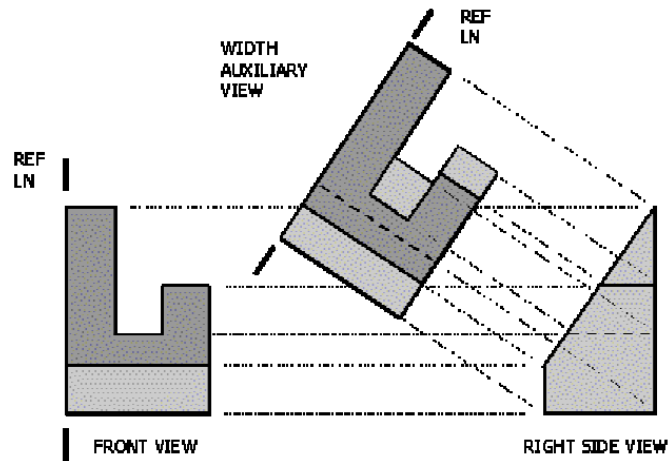
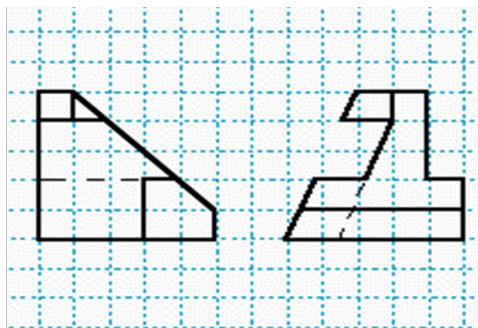


Fig. 4.17 Creation of an Auxiliary View from the given

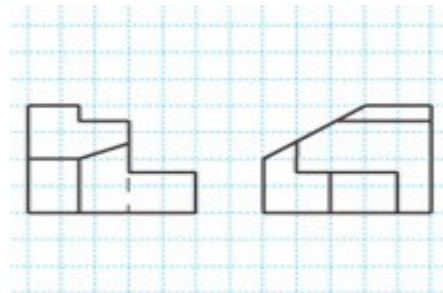
views

Sketching Assignments.

1. Given two orthographic views of an object, your task is to create the auxiliary view.



(a)

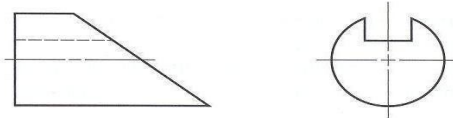


(b)

CHAPTER 4 AUXILIARY VIEWS

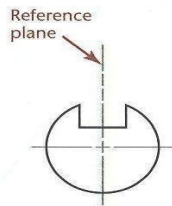
SHOWING AN INCLINED ELLIPTICAL SURFACE TRUE SIZE

Given the front and side views shown, use these steps to project an auxiliary view showing true size of the elliptical surface.

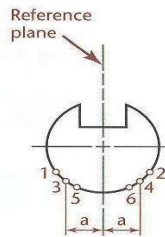


STEP by STEP

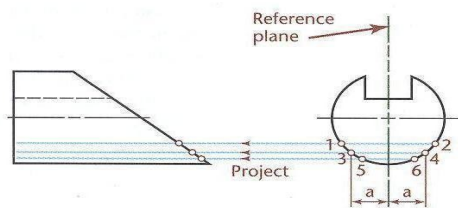
- 1 Since this is a symmetrical object, use a reference plane through the center of the object, as shown.



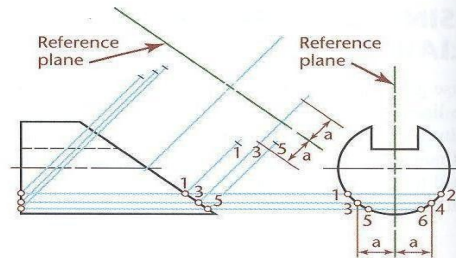
- 2 Select points on the circle in the side view.



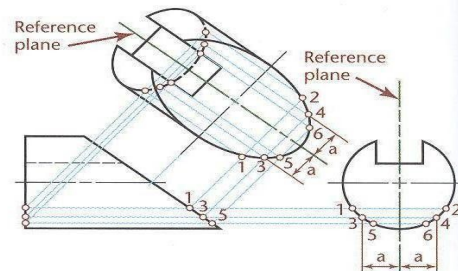
- 3 Locate the same points on the inclined surface and the left-end surface.



- 4 Project each point to the auxiliary view along its projection line.



- 5 Transfer distances from the side view to the auxiliary view. Because the object is symmetrical, two points can be located with each measurement, as shown for points 1-2, 3-4, and 5-6. Project enough points to sketch the curves accurately.



Since the major and minor axes are known, you can quickly create similar ellipses using CAD by locating the major and minor axes or the center and axes. For hand sketching you may want to use an ellipse template.

STEP by STEP

cha-4

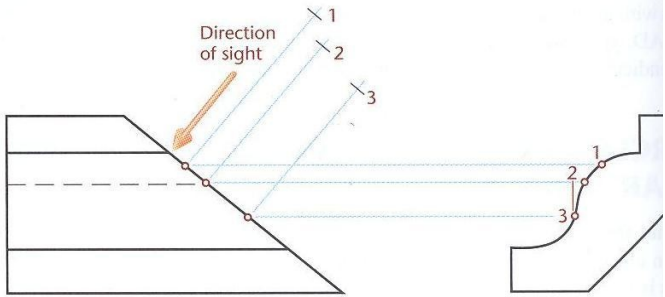
AUXILIARY VIEWS

PLOTting CURVES IN AN AUXILIARY VIEW

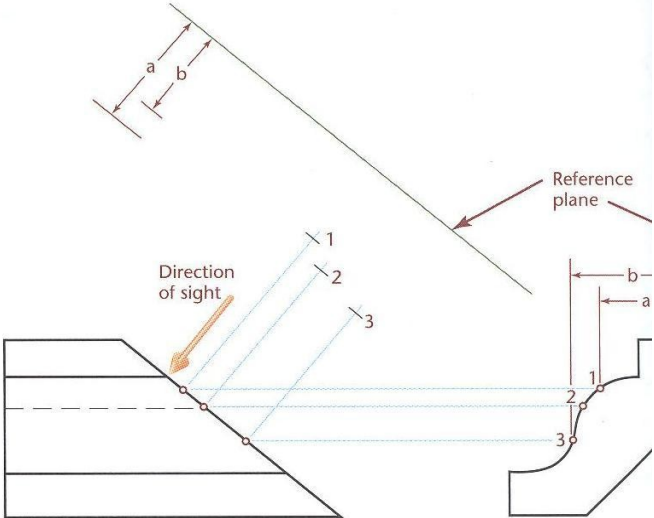
Use the following steps to create an auxiliary view that shows the true size and shape of the inclined cut through a piece of molding. The method of plotting points is similar to that explained for the ellipse.

- 1

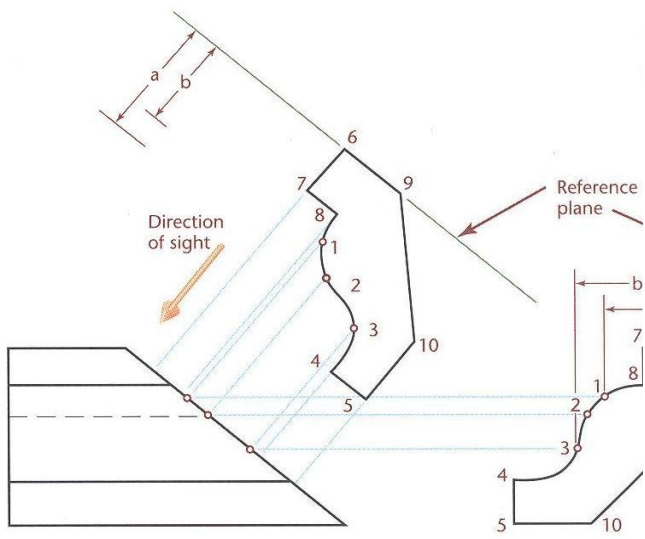
Identify some points along the curve shown in the side view. Locate those same points in the front view. The curved shape is the inclined surface.


- 2

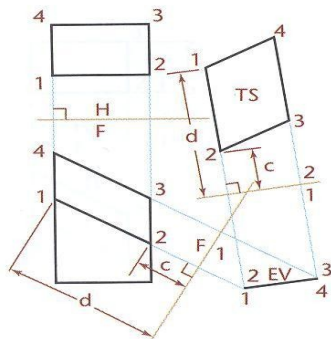
Locate the reference plane and project the points into the auxiliary view.


- 3

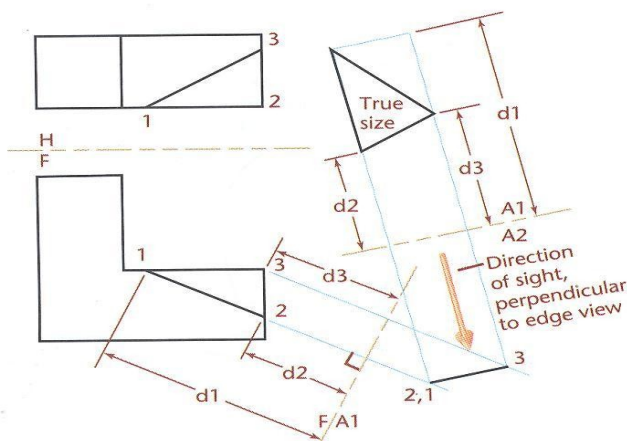
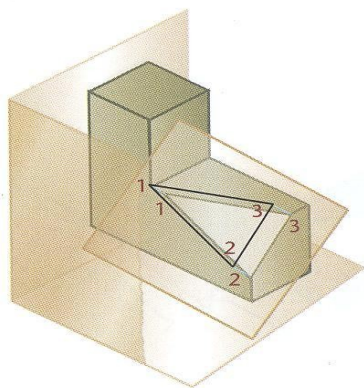
Finish projecting all of the points on the inclined surface and draw its true shape in the auxiliary view.



CHAPTER 4 AUXILIARY VIEWS



True Size of an Oblique Surface



True Size View of an Oblique Surface

TRUE SIZE OF AN OBLIQUE SURFACE

As shown in Figure 7.30, a plane will show true size when the plane of projection is parallel to it.

To show the true size view of a plane, choose the direction of sight perpendicular to the edge view of the plane.

Showing the true size of a surface continues from the method presented for showing inclined surfaces true size, where the edge view is already given. But to show an oblique surface true size, you need to first show the oblique surface on edge and then construct a second auxiliary view to show its true size.

Showing the True Size and Shape of an Oblique Surface

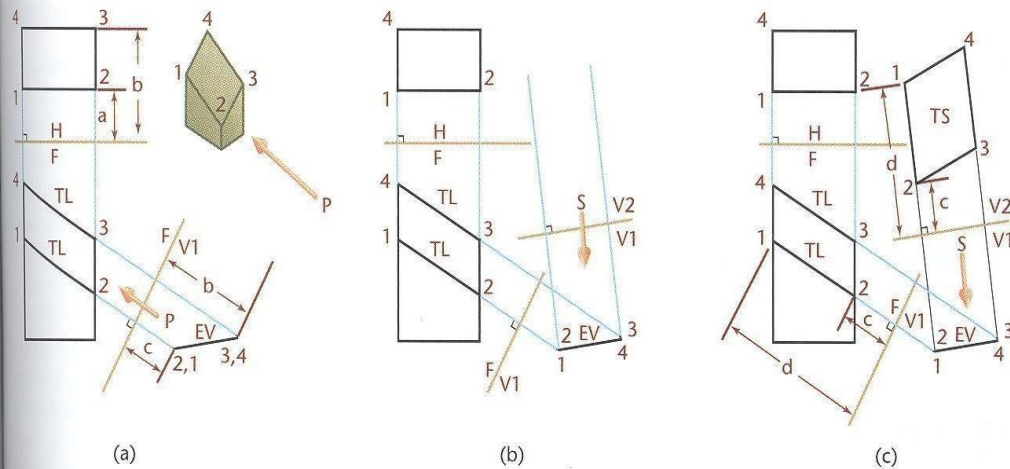
To show the true size and shape of an oblique surface, such as surface 1-2-3-4 in Figure 7.31, create a second auxiliary view. In this example folding lines are used, but you can achieve the same results for all of the preceding examples using reference lines.

1. Draw the auxiliary view showing surface 1-2-3-4 on edge, as explained previously.
2. Create a second auxiliary view with the line of sight perpendicular to the edge view of plane 1-2-3-4 in the primary auxiliary view. Project lines parallel to the arrow. Draw folding line 1/2 perpendicular to these projection lines at a convenient distance from the primary auxiliary view.
3. Draw the secondary auxiliary view. Transfer the distance to each point from folding line F/1 to the second auxiliary view—for example, dimensions c and d. The true size TS of the surface 1-2-3-4 is shown in the secondary auxiliary view since the direction of sight is perpendicular to it.

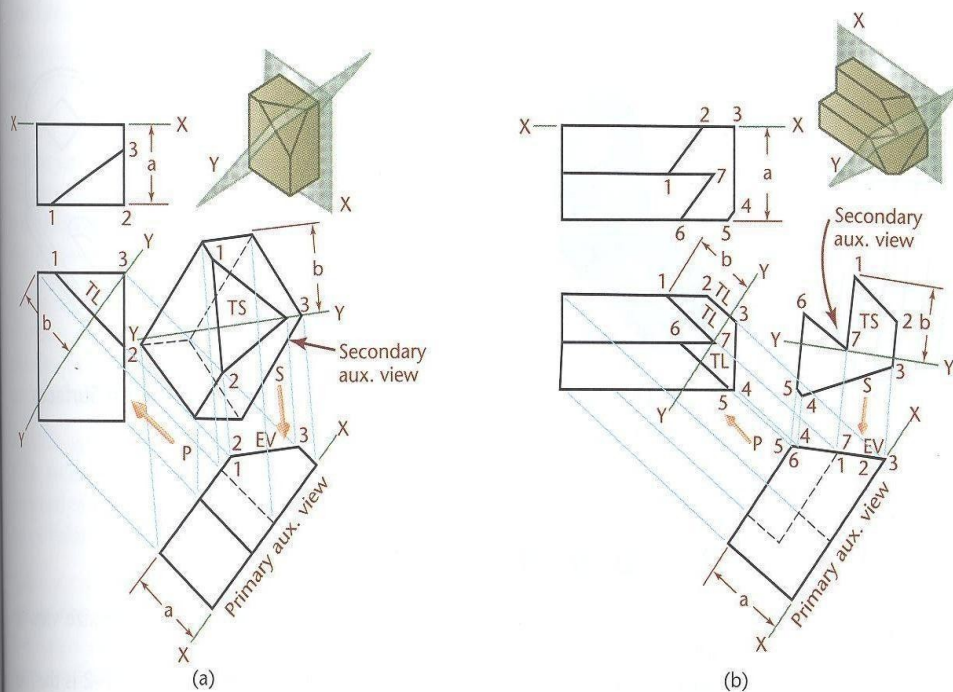
Figure 7.32 shows an example of the steps to find the true size of an oblique surface. The first step, illustrated in Figure 7.32a, shows the oblique surface on edge. Figure 7.32b establishes the direction of sight perpendicular to the edge view. The final true size view of the surface is projected in Figure 7.32c.

Figure 7.33 shows a similar example using the reference plane method.

TRUE SIZE OF AN OBLIQUE SURFACE

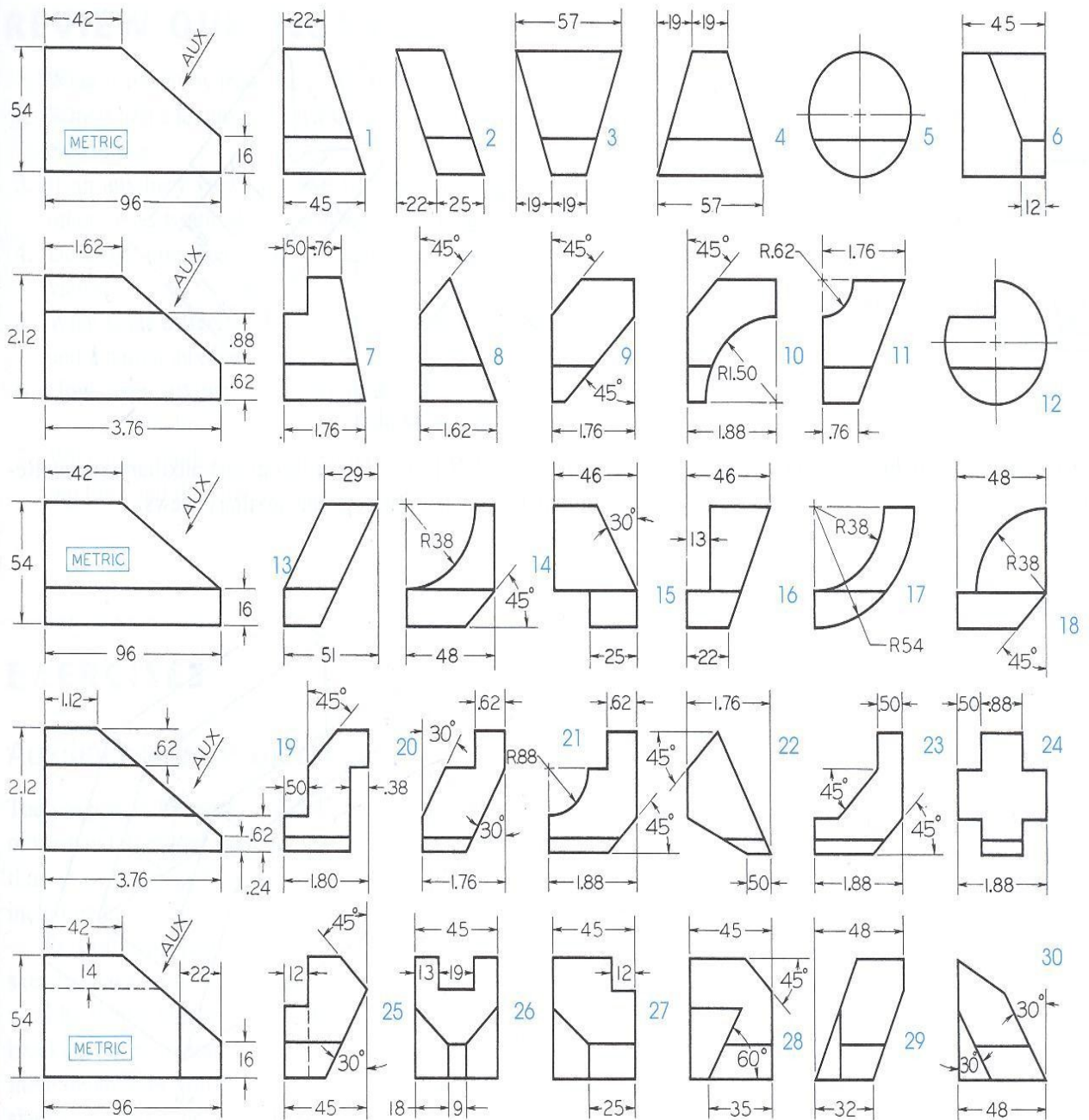


True Size of Oblique Surface—Folding Line Method



True Size of an Oblique Surface—Reference Plane Method

CHAPTER 4 AUXILIARY VIEWS



Exercise 4.1 Auxiliary View Problems. Make freehand sketch or instrument drawing of selected problem as assigned. Draw given front and right-side views, and add incomplete auxiliary view, including all hidden lines. If assigned, design your own right-side view consistent with given front view; and then add complete auxiliary view.