Auxiliary Views

Drafting 30

Yuba College
Auxiliary Views - Overview

- Inclined planes, oblique planes and oblique lines do not appear true length or true size in any of the principle planes of projection.
- To determine the true length of an oblique line or the true size of an inclined or oblique plane an auxiliary view must be created.
Auxiliary View Definition

- **Auxiliary view** - is an orthographic view that is projected onto any plane other than one of the six principal views.

- **Two methods are used:**
  - The folding-line method
  - The reference plane method.
• Auxiliary View of inclined Plane

![Diagram of Auxiliary View of inclined Plane](image-url)
Steps to creating an auxiliary view:
- Define a line of sight
- Define a folding line or reference plane

Do these steps sound familiar?

Many objects are shaped such that their principle faces cannot be positioned parallel to the regular planes of projection. Example:
The Auxiliary Plane

- Does surface “ABCD” appear true size or shape in any regular view?
- In this case, the auxiliary plane is assumed to be parallel to surface “ABCD”.
- The line of sight is perpendicular to surface “ABCD”.

![Diagram showing auxiliary plane and line of sight]
The auxiliary plane is perpendicular to the frontal plane and is hinged to it.

When the horizontal & auxiliary planes are unfolded to appear in the same plane as the frontal plane, the folding lines represent the hinge lines joining the planes.
The Auxiliary Plane cont.

- When auxiliary views were developed using the traditional manual methods, the folding lines were very important to the development of auxiliary views.
- With CAD software the use of folding lines is still useful when creating 2 dimensional drawings.
Auxiliary View Classifications

- **Primary Auxiliary view** - is single view projected from one of the six principal views.
- **Secondary auxiliary view** - is a single view projected from a primary auxiliary view on to a plane that is inclined to all three principal projection plane.
- **Tertiary auxiliary view** - is a single view projected from a secondary or another tertiary Auxiliary View.
Auxiliary views are also classified and named according to the principle dimensions of the object shown in the auxiliary view.

- Height Auxiliary Views
- Width Auxiliary Views
- Depth Auxiliary Views
A height auxiliary view is projected from the top view, and the height dimension is shown true length.
A width auxiliary view is projected from the profile view, and the width dimension is shown true length.
A depth auxiliary view is projected from the front view, and the depth dimension is shown true length.
Developing an Auxiliary View - Folding Line Method

- Given the top and front views, draw an auxiliary view showing the true size and shape of surface “P”.
- Draw a folding line (H/F) for the auxiliary view at any convenient distance from the front view (Y).
- Distance “X” & “Y” may or may not be equal.
- Define the line of sight.
Related Views

- Two views are related by dimension when they are both adjacent to the same projection plane.
- The distances from the edge view (folding line) of the common plane to a point, determines the distance to the point in the auxiliary view.
Related Views

- Three dimensional viewpoint of related planes.
Related Views

- Two dimensional orthographic view of a point in related views.
Developing an Auxiliary View - Folding Line Method

- Draw a folding line (F/1) for the auxiliary view at any convenient distance from the front view.
- The distances “X” must be equal.
- Draw the auxiliary view locating all points the same distance from F/1 as they are from H/F.
Developing an Auxiliary View-Reference Plane Method

- In the folding line method of auxiliary view development the folding lines represent the edge views of the projection planes.
- The frontal plane can be considered a reference plane, or datum plane, for transferring distances.
Developing an Auxiliary View—Reference Plane Method cont.

- Instead of using one of the planes of projection it may be more convenient to assume a reference plane that is parallel to the plane of projection and touching or cutting through the object.
Reference Plane Guidelines

- Remember the following:
  - Reference lines are always at right angles to the projection lines between views.
  - A reference plane appears as a line in two related views.
  - Measurements are always made at right angles to the reference lines.
  - In the auxiliary view, all points are the same distance from the reference line as the corresponding points are from the reference line in the related view.
Drawing an Auxiliary View-Reference Plane Method
Drawing an Auxiliary View-
Reference Plane Method cont.
Dihedral Angles

- **Dihedral Angle** is the angle between two planes.
- One of the principle uses of auxiliary views is to show dihedral angles in true size, mainly for dimensioning.
Rules for Auxiliary Views

- **Rule 1** - To get the edge view of a plane, find the point view of any line in that plane.
- Line 1-2 lies in both planes, therefore a point view of this line will show both planes as lines, and the dihedral angle between them.
Rules for Auxiliary Views cont.

- **Rule 2** - To get the true angle between two planes, find the point view of the line intersection of the planes. Fig. a
- Does the angle between planes A & B appear larger or smaller? Fig. b
- Why does the angle between the planes not appear to be true size?
Rules for Auxiliary Views cont.

- **Rule 3** - To draw a view showing a true dihedral angle, assume the direction of sight parallel to the line of intersection between the planes of the angle.
Partial Auxiliary Views

- The use of auxiliary views often makes it possible to omit one or more regular views.
- The completeness of detail may add nothing to clarity and may even detract due to the clutter of lines.
- Partial regular & partial auxiliary views are often sufficient and the resulting drawings are considerably clearer and easier to read.
If an auxiliary is symmetrical, and if it is necessary to save space on the drawing, only half of the auxiliary may be drawn.
Auxiliary View Sections

- An auxiliary section is simply an auxiliary view in section.
- The same guidelines apply to auxiliary sections as they do to regular view sections.
Auxiliary View Sections cont.
Successive Auxiliary Views

For a person with way too much time on their hands!!!!!
Using 3D CAD, any view can be generated in one or two steps, eliminating the need to project auxiliary views manually.

It is still essential that you have a clear understanding which line of sight will produce a true size view and which shows the true dihedral angle.

When measuring or dimensioning a view from a CAD drawing, if the surface or angle is not true size, the CAD system does not know the difference and will measure or dimension what you direct it to. Common error for the inexperienced.
Complete Drawing

Partial Regular & Auxiliary Views
That's All
Regular & Auxiliary Views

(a) Regular Views

(b) Auxiliary View