ENGR1170

Auxilliary Views
Auxiliary Views

- Auxiliary views are most commonly used to show the true size of a surface that is not parallel to any of the principal viewing planes.

- Auxiliary views are created in the same way as other orthographic views but they depict a view from some non-ortho direction.
Auxiliary Views Applications

- True size of an inclined or oblique plane
- True Length of a line
- Point view of a line
- Edge view of a plane
- Reverse Construction
Auxiliary Views

- **Primary:**
  - Single view projected from one of six principal views

- **Secondary**
  - Single view projected from a primary auxiliary view

- **Tertiary**
  - Single view projected from a secondary or another tertiary auxiliary view
The inclined plane ABCD would not have its true area in any of these views.
To get the true area we have to look along a perpendicular to the plane.
Another Auxiliary Example
Auxiliary Views Types

- **Partial**
  - Only details of the inclined plane are projected and drawn

- **Half**
  - Only half of an object is drawn (symmetrical)
Curves

How do you treat curves?

- Introduce projection lines that cut the surface and project these intersections as a typical auxiliary projection. See diagram below:

- The reference plane was placed at the center of the cylinder for convenience.
True length of a line

- A line will show true length in a plane of projection which is parallel to the line.

- To show a line true length, make the fold line parallel to the line in question.

- Therefore, if a line is parallel to a multi-view fold line in one view then that line is a true length in the other view (connected by that fold line).
True length of a line

- In the front view AB is parallel to fold line 2, therefore it is a true length line in the side view.
Line as a point

- A line will show as a point view when projected onto a plane perpendicular to it.
- To show a point view, choose the direction of sight parallel to the line where it is show true length.
Secondary Auxiliary Views

- An oblique surface requires a secondary auxiliary view to show the surface in true shape.
Example: Secondary Auxiliary View

- The top view shows the oblique surface
- A secondary auxiliary view is needed to show the surface in true shape
- The lengths of sides and angles are distorted in all other views
- Perpendicular projection lines and reference planes are used to construct the right side view from the front and top view
Example: Secondary Auxiliary View

- A true length line on the oblique surface is identified in the right side view.
- Placing a fold line which is perpendicular to the true length line gives the edge view of the surface.
- This auxiliary view is a primary auxiliary view.
- The edge view of the surface is needed to obtain the true shape view.
Example: Secondary Auxiliary View

- A fold line which is drawn parallel to the edge view of the oblique surface gives the secondary auxiliary view showing the surface in true shape.
- Reference planes and perpendicular projectors are used to determine the location of vertices.
- Often only the inclined or oblique surface is shown in auxiliary views.
Example: Secondary Auxiliary View

- Simplify the construction of drawings by starting with only a portion of the drawing
- The right side view is constructed by using parallel projection lines and reference planes
- Vertices are numbered to help keep track of correct distances from reference planes
A true length line is identified in the right side view

- line 2-4 is parallel to the fold line between the front and right side view
- line 2-4 is a true length line in the right side view

A fold line perpendicular to the true length line gives the edge view of the oblique surface
Example: Secondary Auxiliary View

- Use UCS to rotate about the Z axis and align the X axis with the edge view of the oblique surface.
- Perpendicular projection lines are constructed (ORTHO).
- Reference planes are used to measure distances along projection lines (OFFSET and DDOSNAP).
- The secondary auxiliary view shows the oblique surface in true shape.
Another Example

- The top view and front view of a surface is shown.
- Is an auxiliary view needed to show the surface in true shape?
- Yes: The surface does not appear as an edge in either view.
Example

- Construct the right side view using projection lines and reference planes
- Note that there are no true length lines in any of the principle views
Example: Secondary Auxiliary View

- Since the surface does not appear as an edge in any of the principle views the surface is oblique and requires a secondary auxiliary view.
- A line is drawn on the surface which is parallel to the fold line between the front and right side view.
- This line appears as a true length line in the right side view.
Example: Secondary Auxiliary View

- The true length line is used to get an edge view of the surface.
- A fold line which is perpendicular to a true length line gives a point view of the line in the adjacent view.
- A plane which contains a line that appears as a point will appear as an edge.
Example: Secondary Auxiliary View

- The secondary auxiliary view gives the true shape of the surface.
- The secondary auxiliary view is constructed by placing a fold line parallel to the edge view of the surface.
Example: Secondary Auxiliary View

- Fold lines are labeled by the name of the principle plane or the level of auxiliary view
  - Primary auxiliary view (1)
  - Secondary auxiliary view (2)
Dihedral Angle

- A dihedral angle is the angle between two planes. An auxiliary view may also be used to determine the dihedral angle.
- To do this, we create a point view of the line of intersection between the two planes.