Surfaces in Orthographic

ENGR 1182
Graphics 04
Today’s Objectives

- Drawing Complex Surfaces in Orthographic
  - Inclined
  - Curved

- GP04 In-Class Activity

- GP04 Out-of-Class Homework Assignment
Inclines in Orthographic

- In orthographic projection, inclined surfaces are defined by the view in which they appear as an edge.
- They are shown as an edge in one view, and as a surface in the other two views.
- The true length is given by the line, the shape is given by the two other views.
Inclined Surfaces: Example

* Note that the edges of the inclined surface project orthographically into the other two views.

* Note that the size of the inclined surface changes in two views, but the shape does not.
Recognizing Principal or Normal Surfaces, Inclined Surfaces and Oblique Surfaces

- A PRINCIPAL SURFACE APPEARS IN ITS TRUE SHAPE IN ONE VIEW AND AS A LINE IN THE OTHER TWO VIEWS WHERE IT IS PERPENDICULAR TO THE OTHER TWO PRINCIPAL PLANES.

- AN INCLINE SURFACE APPEARS AS A LINE IN ONE VIEW AND IN ITS CHARACTERISTIC SHAPE IN THE OTHER TWO VIEWS WHERE IT IS ANGLED WITH RESPECT TO THE OTHER TWO PRINCIPAL PLANES.

- AN OBLIQUE SURFACE APPEARS IN IT’S CHARACTERISTIC SHAPE IN ALL THREE VIEWS WHERE IT IS ANGLED TO THE OTHER THREE PRINCIPAL PLANES.

Principal Planes:  TOP, FRONT & RIGHT
Curved Features in Orthographic

- Curved surfaces are similarly described in orthographic
- Curved features appear as a curved edge in one view, as a surface in the other two views
Centerlines and Centermarks

- Centerlines and centermarks are used to show the center of a circular or cylindrical feature.

Note that some SYMMETRICAL objects only require 2 views, in this case either the front & right side or the front & top views are required!
Centerlines and Centermarks

- Centerlines and centermarks are used where the arc of a surface is $\geq 180^\circ$.
- Centerlines are drawn through the length of the center of a cylinder or circular hole.
- Centerlines are shown as alternating long and short dashes.
- Both centerlines and centermarks extend past the edges of the circular feature.
Line Precedence

- **Visible lines** takes precedence over all other lines
- **Hidden lines** take precedence over center lines
- **Center lines** have lowest precedence

- In this drawing, a visible line overlies a centerline.
- Notice that the extension lines from the centerline are still visible.
- Notice also the small gap between the centerline extension and the object.
Line Precedence Example

AN ILLUSTRATION OF LINES, MARKS AND LINE PRECEDENCE

Visible Lines cover Hidden Lines cover Center Lines

Hidden Line covers Center Line - hole gap for Center Line

Center Mark extends just beyond curved surface

Visible Lines cover Hidden Lines

Center Line extends just beyond object boundary

Visible Lines

The Ohio State University
First Year Engineering

Dwg. Title: GRAPHICS 3
Scale: HALF
Inst: DR. WHO
Units: INCH
Dwg No.: 01
Drawn By: DR. WHO
Hour: 8:00
Sheet: 00
Date: 09/31/15
In-Class Activity (GP04) - Inclines

Sketch the Front, Top and Right side views of each object. Include all hidden lines.

GP-13 (In-Class)
Sketch the Front, Top and Right side views of each object. Include hidden lines, center lines and center marks.