Sectioning

Sectioning is used to show the hidden portions (features) of a complicated part.

Terminology

3 Main Types

- Full Sections
- Half Sections
- Revolved Sections
Full Section

- Object is cut fully across from one side to the other

Offset Section

- Cutting plane symbol:
  - Should be DARK & THICK to stand out from drawing
    - Heavy, long dash
    - Long, short, short
  - Should be labeled and resulting section also labeled

- The \[ \text{C} \] may also be used as a cutting plane in which case the sagittal section is dropped.
Half Section

- Used for symmetric objects
- Only half the object is drawn sectioned, other half drawing normally
Revolved Section

- Selected section revolved 90° into the view
  - Can be drawn either with or without breaks in the object.

- Revolved section can also be placed beside object - Removed section

![Diagram of revolved section with and without breaks](image)

Figure 16: Value of removed sections for a complicated shape.
Sectioning Conventions

- **CLARITY** is the most important aspect
- allowed some "graphic license" if it improves clarity

i.e.

1. Leave **unsectioned** any feature through which a cutting plane passes if:
   d) The shape of the feature would be lost.
   e) The feature is a fin, spoke, or other aspect not solid throughout the entire object.

2. Leave **unsectioned** solid objects on the centreline of any assembly parts.
- Can change an object's alignment to improved clarity

Exercises: 39 & 40
Offset cutting plane.

A line created by offset rotation.

What if it intersected in section view?

Types of cutting plane depressions on the section view (not included).
Ribs/Fins

Show hole increased by cutting tool.

Ribs/Fins

In any section, ribbing is cut into forms.

Probes
3-D Viewing Formats

There are 3 basic classes of 3D drawing formats we are concerned with:

1. **Isometric** - (subset of axonometric pp. 77-81)

2. **Oblique** - 2 types
   - cabinet
   - cavalier

3. **Perspective** - 3 types
   - 1 point
   - 2 point
   - 3 point (rarely used)

1. Isometric

   - all 3 axes are separated by $120^\circ$
   - convenient - since the axes are easy to lay out
   - subset of axonometric (trimetric, dimetric, and isometric)
   - disadvantage - features are not true shape
2. Oblique

- y and x axes are separated by 90°
- z axis is separated from x-axis by 30° or 45°
- advantage - object faces are true shape (e.g. F)
- disadvantage - z-axis portion can look distorted (too long)
  - solution - use half scale on z-axis (cabinet)

(If z-axis is full scale then drawing is termed cavalier oblique)
• Object generally placed so that longest side is along x-axis.
• 1/2 scaling on z-axis is then used to reduce distortion effects.

3. Perspective

In reality, object lines appear to converge to a point in the distance (termed vanishing point (VP)).

• used mainly by architects, artists, landscape architects, etc.
Fig. 17-56. A one-point perspective. (Courtesy of ANSI: Y14.4-1957.)

Fig. 17-58. A two-point perspective. (Courtesy of ANSI: Y14.4-1957.)

Exercises: #29, #19