

SECTIONING

Introduction

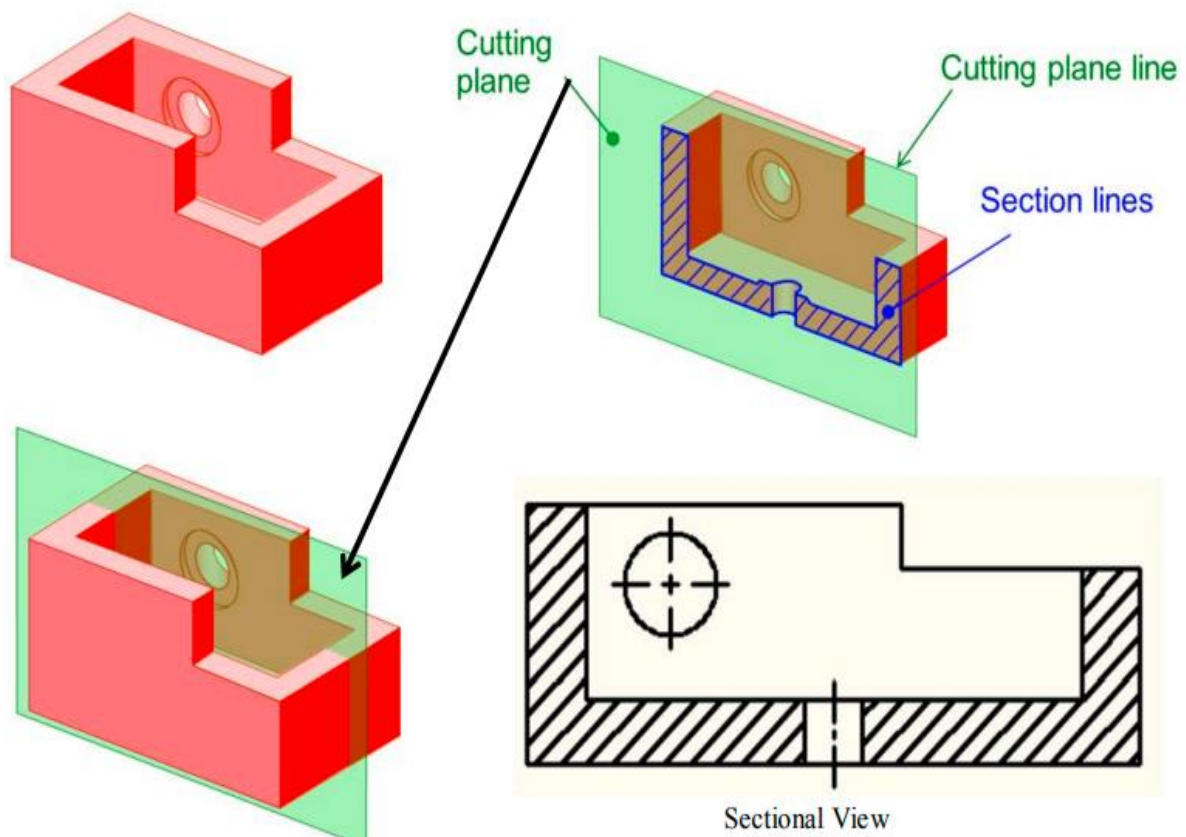
The conventional method used to draw an object using the multi view or orthographic method of representation is discussed in previous work. This system is excellent to illustrate various external features.

In this method, complicated interior features are illustrated with hidden lines. These interior features can be shown more clearly by the use of sectional views.

Terminology

Sectioning It is defined as an imaginary cut made through an object to expose the interior or to reveal the shape of a portion.

Sectional View A sectional view is a view of an imaginary surface, exposed by an imaginary slicing-open of an object, allowing interior details to become visible. A sectional view is sometimes referred to as a cross section or simply section. It is a view in which all or a substantial portion of the view is sectioned.

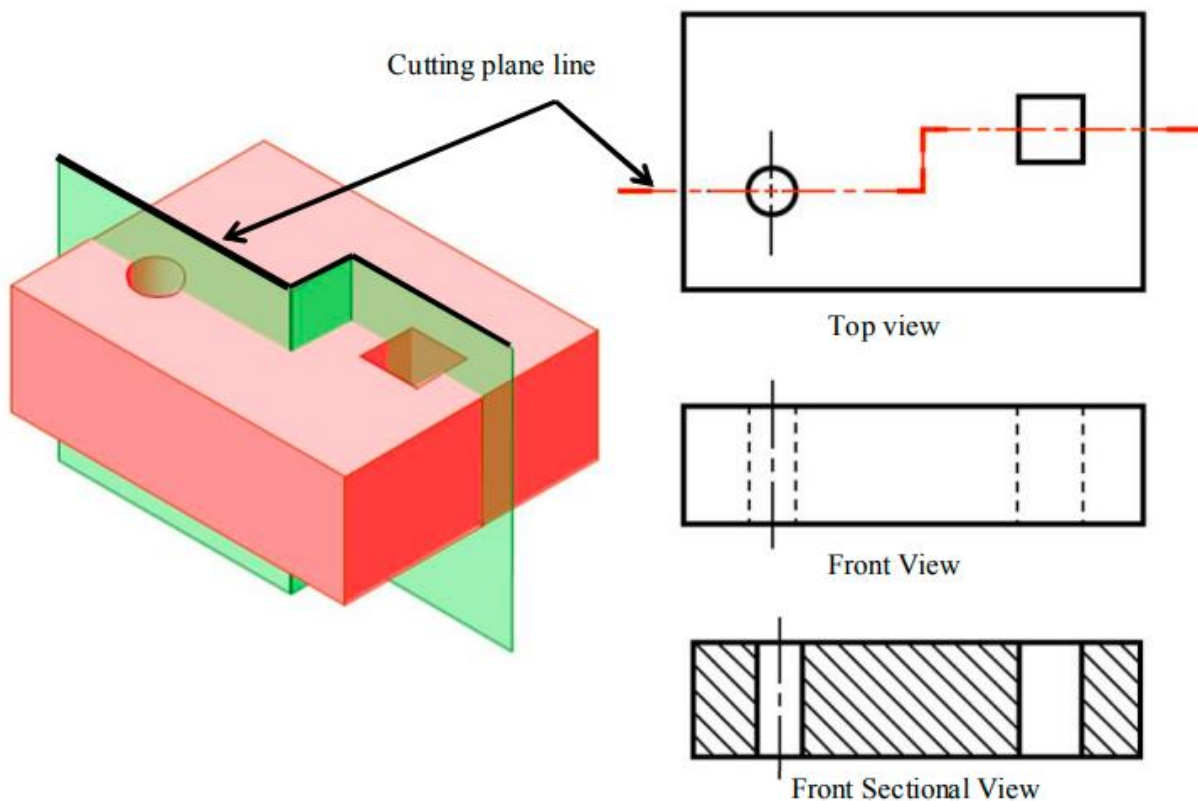


Cutting Plane

Cutting plane is a plane that imaginarily cuts the object to reveal the internal features.

Cutting Plane Line Cutting plane line is an edge view of the cutting plane. The cutting-plane line indicates the path that an imaginary cutting plane follows to slice through an object.

Think of the cutting-plane line as a saw blade that is used to cut through the object. The cutting-plane line is represented by a thick black dashed line. Standard format of cutting plane line is already discussed previously.

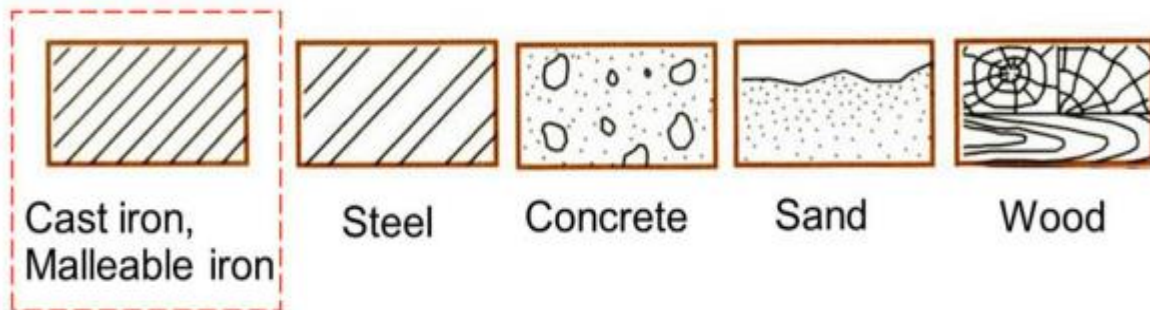


Section Line and Sectional View

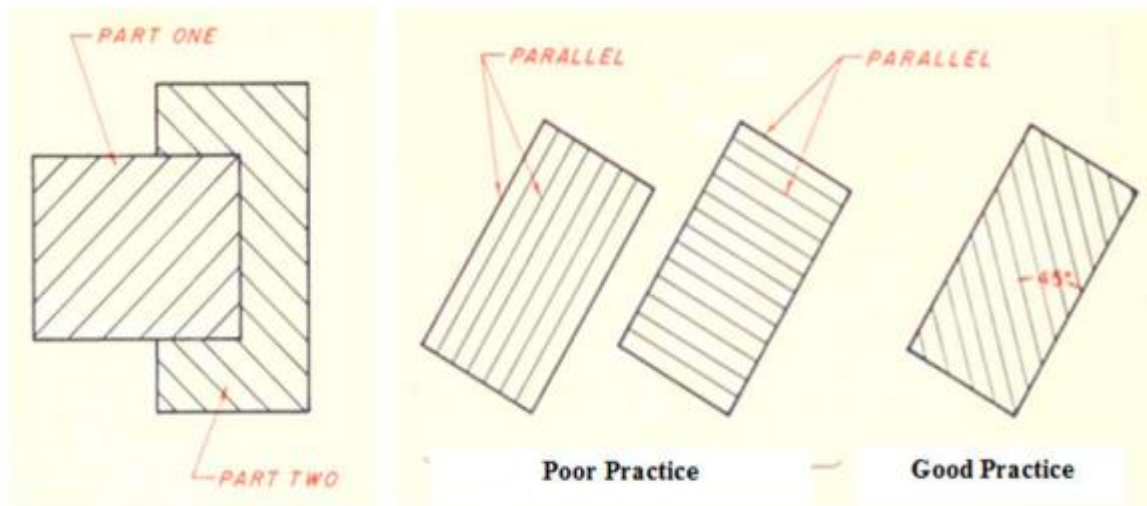
Section Lining

Section lining shows the locations where the object is sliced or cut by the cutting plane or the location where the surface or surfaces are cut by the cutting plane. Symbol for section lining is different for different materials, but in practice the symbol of cast iron i.e. the cross-hatch lines are used for sectioning of any materials. They are represented by thin, black lines drawn at 45° to the horizontal, unless there is some specific reason for using a different angle. Section lining is

spaced by eye from 1/16" (1.5mm) to 1/4"(6 mm) apart, depending upon the overall size of the object. The average spacing used for most drawings is .13"(3 mm). However, all the section lines in a drawing must be of uniform thickness and they should be evenly spaced. If a cutting plane passes through two parts, each part has section lines using a 45° angle or other principal angle. These section lines should not be aligned in the same direction. If the cutting plane passes through more than two parts, the section lining of each individual part must be drawn at different angles. When an angle other than 45° is used, the angle should be 30° or 60°. Section lining should not be parallel with the sides of the object to be section lined.



Symbol for Section Lining of Different Materials



Method of Aligning Section Lines

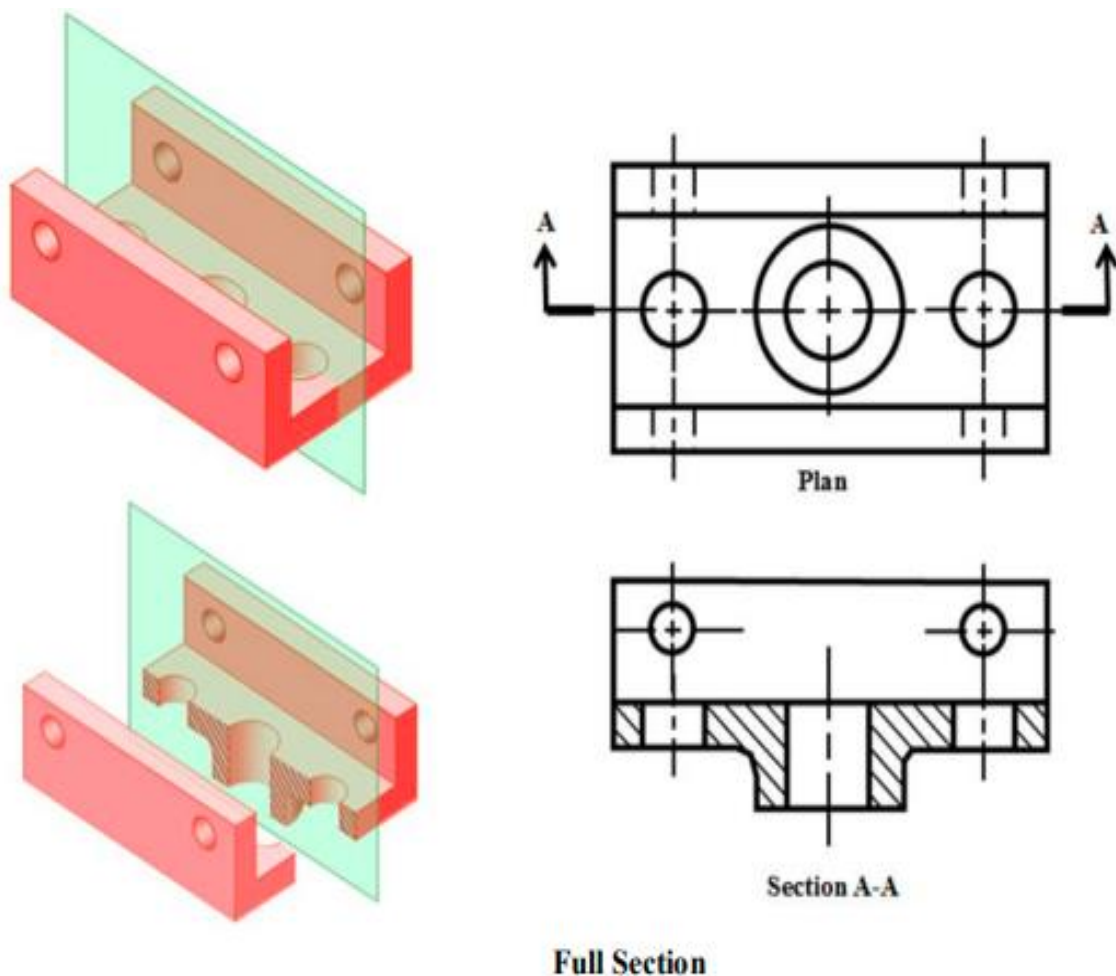
Types of Section

The different kinds of sections used today are:

- i. Full section ii.
- ii. Offset section
- iii. Half section
- iv. Broken-out section
- v. Revolved section
- vi. Removed section.
- vii. Auxiliary section etc.

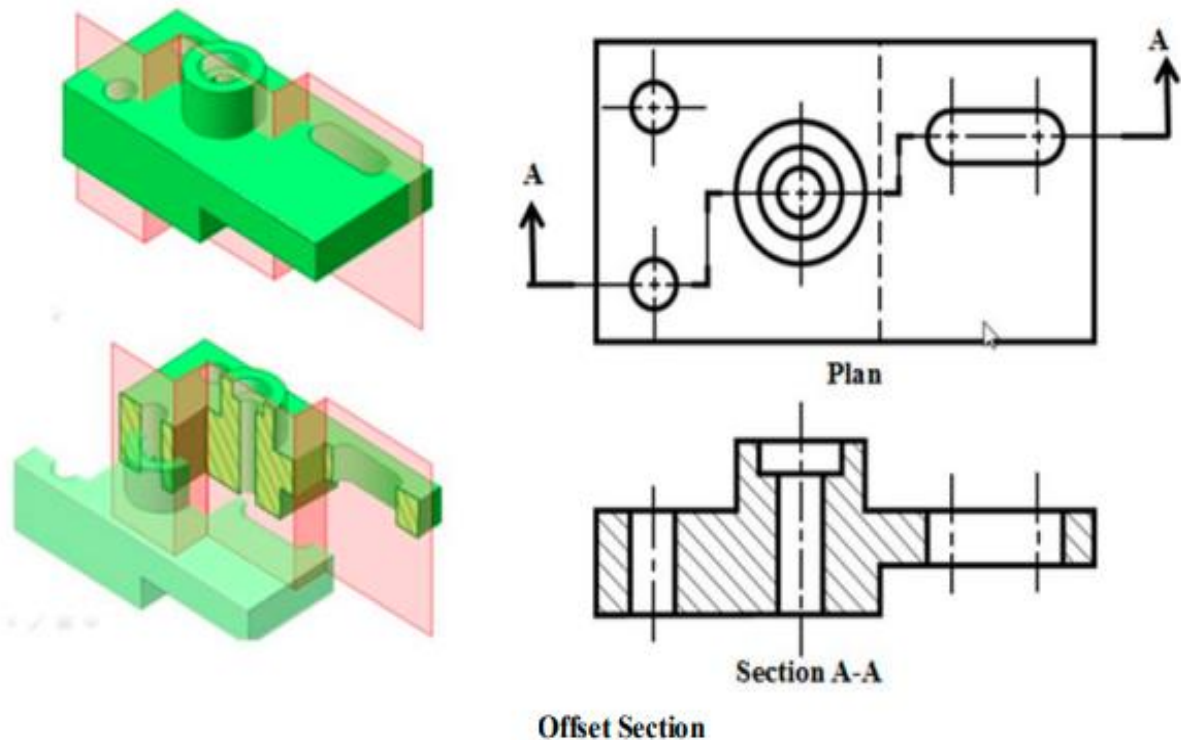
In this part, we only discuss the most commonly used types of sections.

Full Section A full section is simply a section of one of the regular multi views that is sliced or cut completely in two. When the cutting plane passes through the entire object a full sectional view is obtained. Hidden lines are omitted from sectional view.



Offset Section

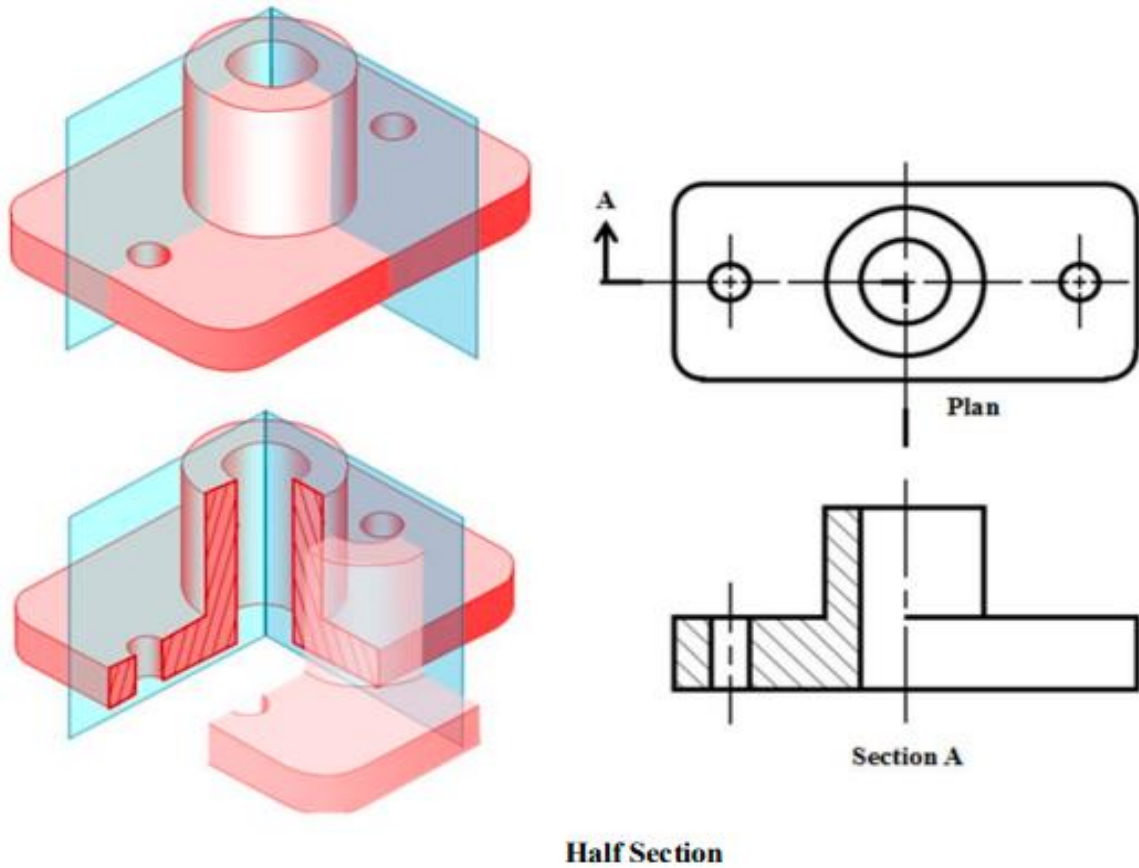
Many times, important features do not fall in a straight line as they do in a full section. These important features can be illustrated in an offset section by bending or offsetting the cutting-plane line. An offset section is very similar to a full section, except that the cutting-plane line is not straight.



Half Section

The sectional view obtained by passing the cutting plane halfway through an object is called a half sectional view. In this case a quarter portion of the object is imagined to be removed. A cutting plane is added to the front view, with only one arrowhead to indicate the viewing direction.

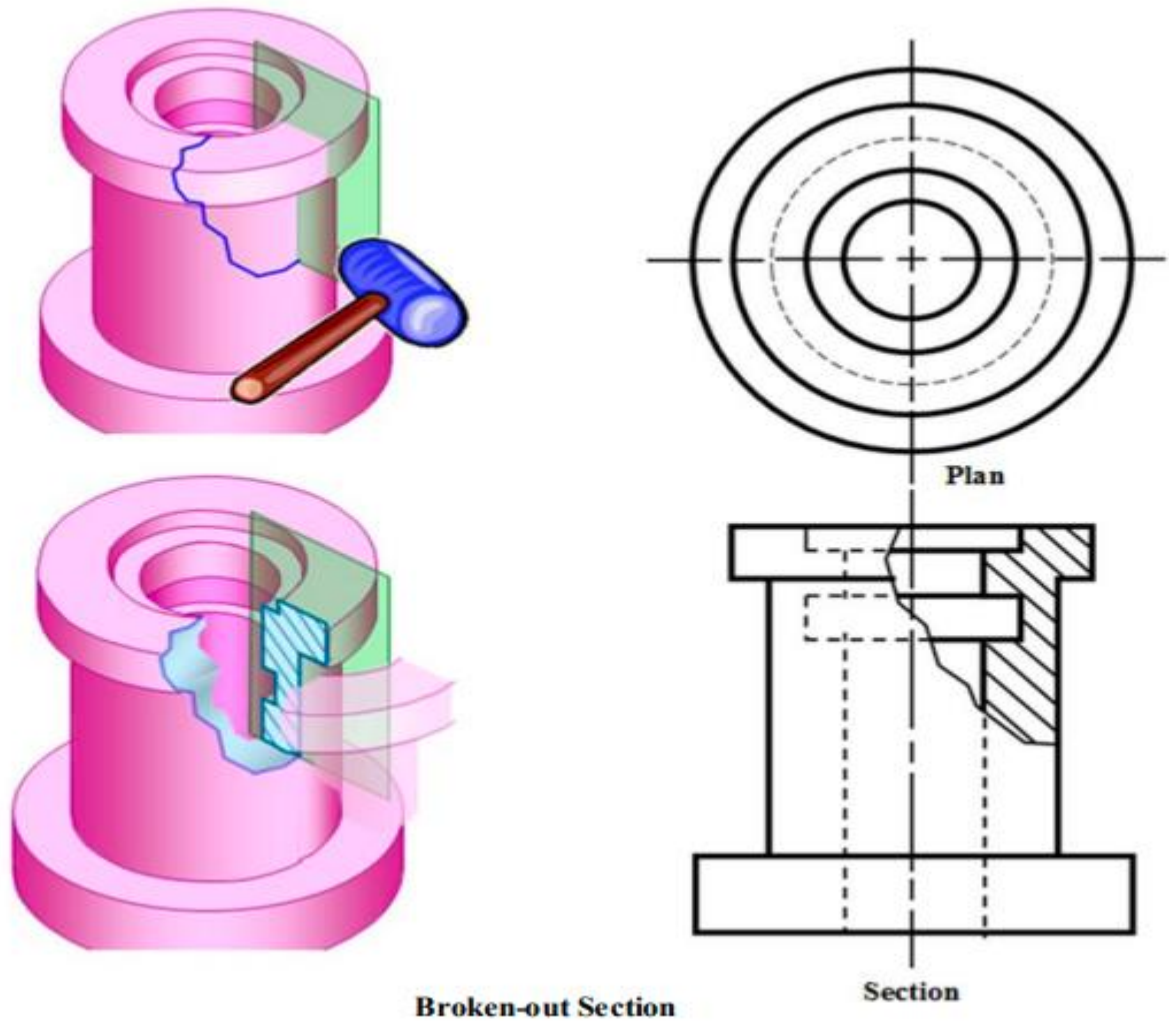
Half sections are best used when the object is symmetrical, that is, the exact same shape and size on both sides of the cutting-plane line. A half-section view is capable of illustrating both the inside and the outside of an object in the same view. A center line is used to separate the sectioned half from the unsectioned half of the view. As usual, hidden lines are omitted from sectional view.



Half Section

Broken-out Section

Sometimes, only a small area needs to be sectioned in order to make a particular feature or features easier to understand. In this case, a broken-out section is used. It is the sectional view of a fractional part of object. Broken-out sections are helpful when some interior details are to be shown but a full or half section is not feasible because that would remove some essential feature of the object. In such case a broken-out section is made directly of the exterior view. In fig. 8.9 the top section is somewhat confusing and could create a question. To clarify this area, a portion is removed. The view is made by passing the cutting plane normal to the viewing direction and removing the portion of an object in front of it. A break line is used to separate the sectioned portion from the unsectioned portion of the view. There is no cutting plane line.



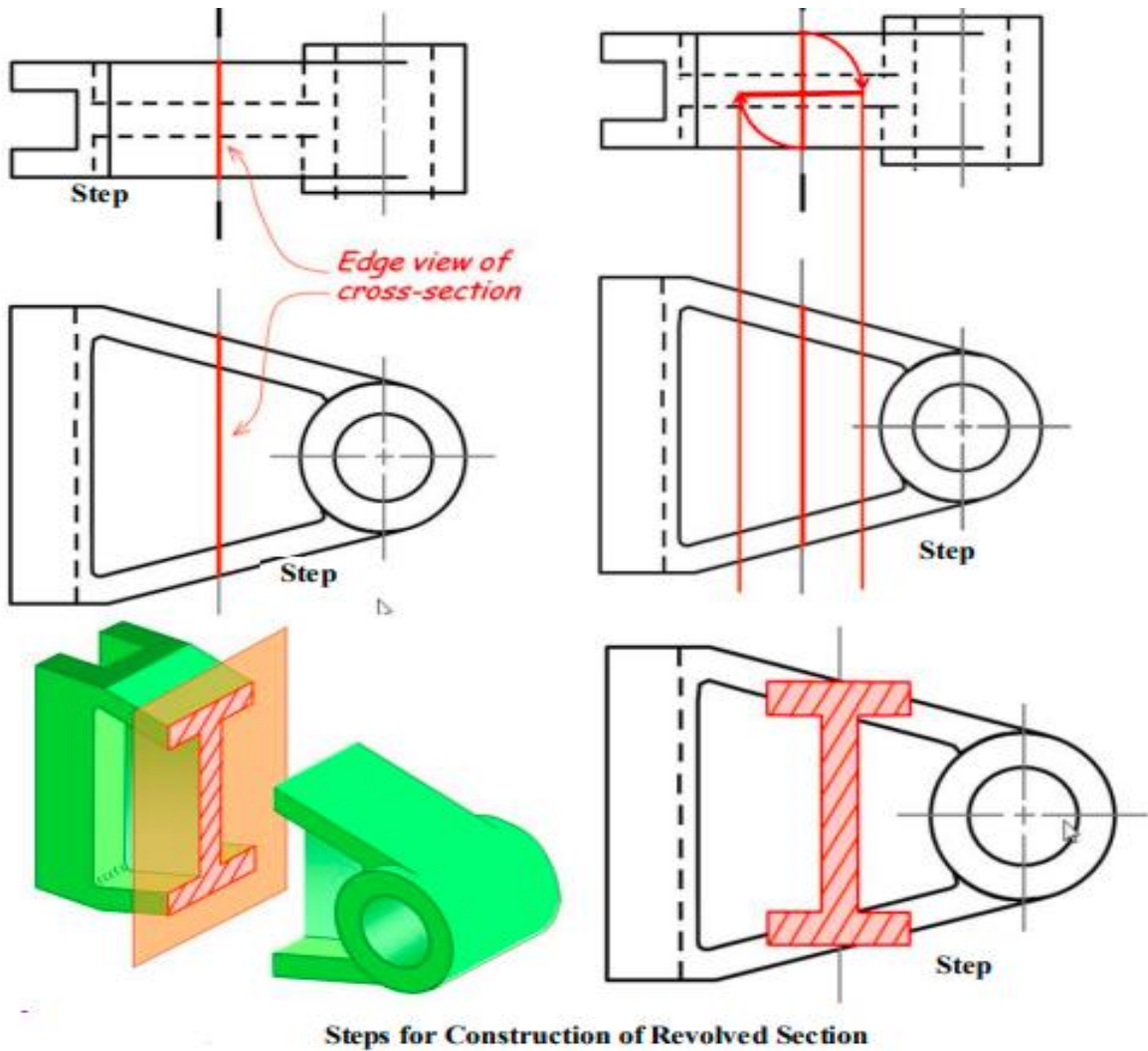
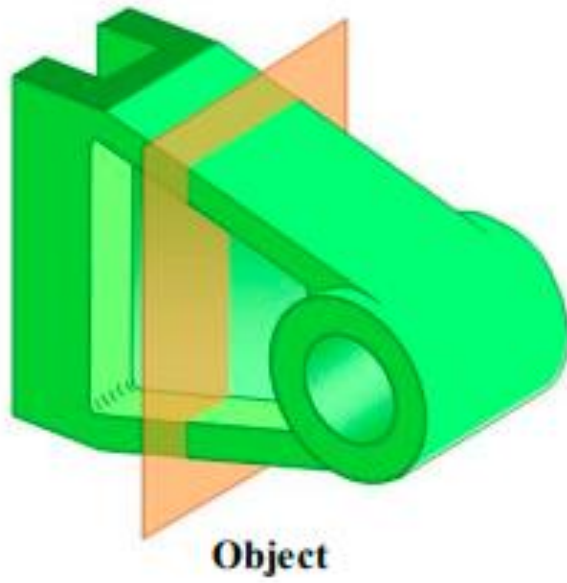
Following the steps of constructing a revolved section

Step 1: Assign position of cutting plane on the top view or plan.

Step 2: Draw axis of rotation in front view.

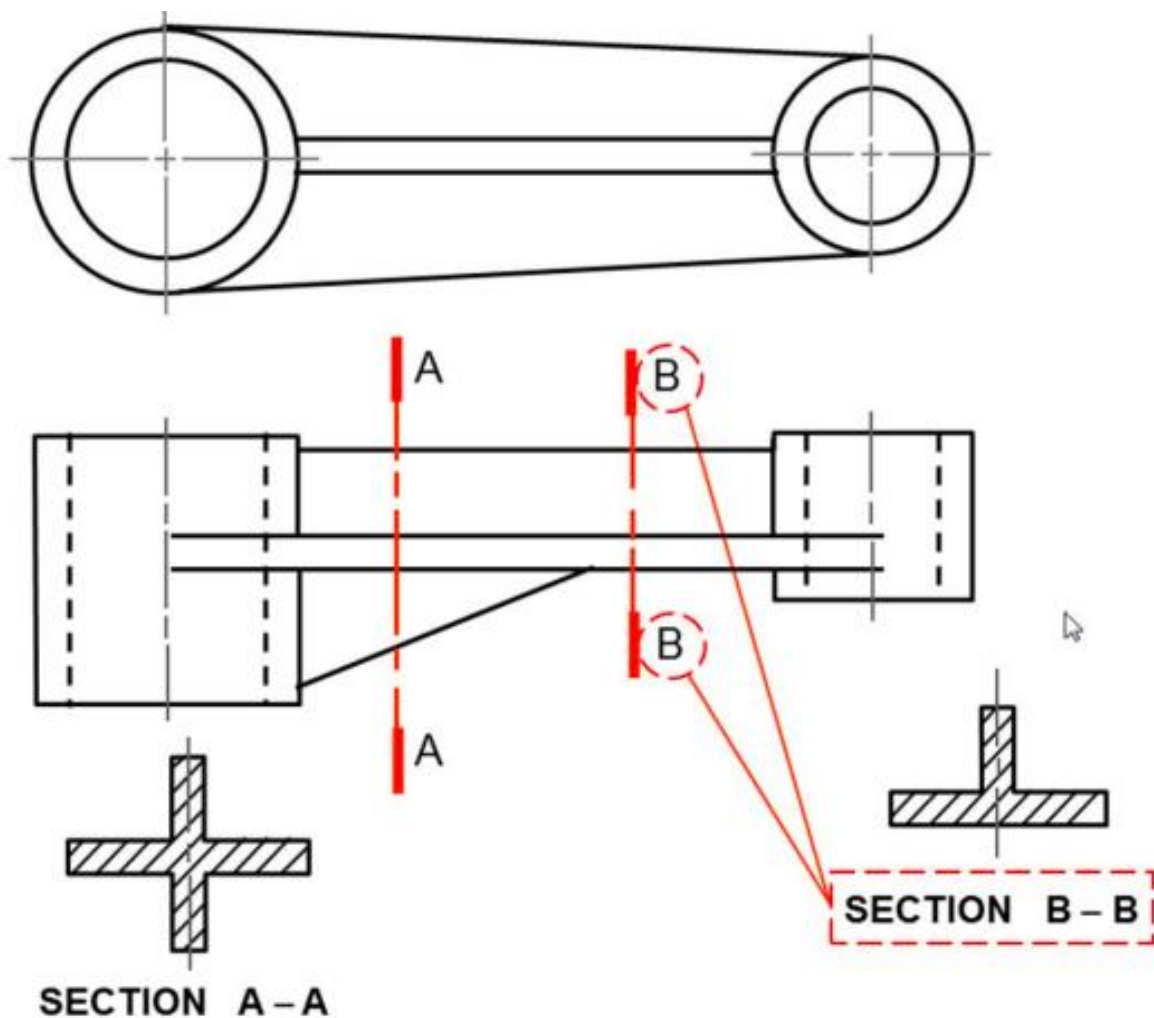
Step 3: Transfer the depth dimension to the front view.

Step 4: Draw the revolved section on the front view enclosed by the lines indicating depth dimension.



Removed Section

Revolved sections tend to be confusing, and often create problems for the people who must interpret the drawings. Today, it is recommended to use a removed section instead of a revolved or rotated section. A removed section is very similar to a rotated section except that, as the name implies, it is drawn removed or away from the regular views. The removed section is also used to illustrate the cross section of ribs, webs, bars, arms, spokes or other similar features of an object. Note that a removed section must identify the cutting-plane line from which it was taken. In the sectional view, do not draw features other than the actual section. The removed section should be drawn on the same page as the regular views.



Removed Section