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Q1 write in detail about the orthographic to isometric projections.

Isometric drawing, also called isometric projection, method of graphic representation of three-dimensional objects, used by engineers, technical illustrators, and, occasionally, architects. The technique is intended to combine the illusion of depth, as in a perspective rendering, with the undistorted presentation of the objects principal dimensions that is, those parallel to a chosen set of three mutually perpendicular coordinate axes.

The isometric is one class of orthographic projections. (In making an orthographic projection, any point in the object is mapped onto the drawing by dropping a perpendicular from that point to the plane of the drawing.) An isometric projection results if the plane is oriented so that it makes equal angles (hence isometric, or equal measure) with the three principal planes of the object. Thus, in an isometric drawing of a cube, the three visible faces appear as equilateral parallelograms; that is, while all of the parallel edges of the cube are projected as parallel lines, the horizontal edges are drawn at an angle (usually 30°) from the normal horizontal axes, and the vertical edges, which are parallel to the principal axes, appear in their true proportions.

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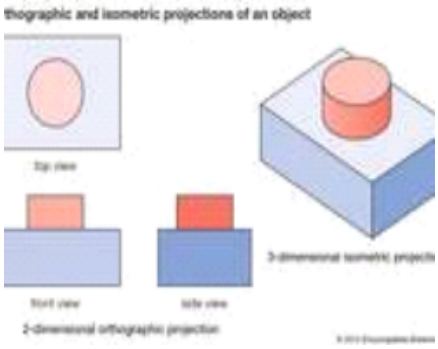


Orthographic projection, common method of representing three-dimensional objects, usually by three two-dimensional drawings in each of which the object is viewed along parallel lines that are perpendicular to the plane of the drawing. For example, an orthographic projection of a house typically consists of a top view, or plan, and a front view and one side view (front and side elevations).

Q2What is orthographic projection? Write its types in detail.

Orthographic Projections is a technical drawing in which different views of an object are projected on different reference planes observing perpendicular to respective reference plane.

Different Reference planes are;

— Horizontal Plane (HP) — Vertical Plane (VP) — Side or Profile Plane (PP)

Different views are;
— Front View (FV) — Projected on VP — Top View (TV) — Projected on HP — Side View (SV) — Projected on PP

Orthographic Projections Orthographic Projections are a collection of 2-D drawings that work together to give an accurate overall representation of an object.

3. Defining the Six Principal Views or Orthographic Views

4. Which Views to Present? General Guidelines Pick a Front View that is most descriptive of object Normally the longest dimension is chosen as the width (or depth) Most common combination of views is to use: Front, Top, and Side View

6. Glass Box Approach Place the object in a glass box Freeze the view from each direction (each of the six sides of the box) and unfold the box

7. Glass Box Approach

8. Glass Box Approach

9. Glass Box Approach

10. Glass Box Approach

11. Glass Box Approach

12. Glass Box Approach

13. First and Third Angle Projections First Angle Third Angle Third-angle Projection First-angle Projection

14. Conventional Orthographic Views Height Depth Width Front View Top View/Plan Right Side View

15. Lines on an engineering drawing signify more than just the geometry of the object and it is important that the appropriate line type is used. Line Thickness For most engineering drawings you will require two thickness', a thick and thin line. The general

recommendation are that thick lines are twice as thick as thin lines. Line Styles Other line styles used to clarify important features on drawings are: A thin line is used for hatching, leader lines, short centre lines, dimensions and projections.
A thick continuous line is used for visible edges and outlines.
Dashed lines are used to show important hidden detail for example wall thickness and holes..
Thin chain lines are a common feature on engineering drawings used to indicate centre lines. Centre lines are used to identify the centre of a circle, cylindrical features, or a line of symmetry.

Q3 What do you know about the Sectional view of solids? Write in detail

ONE OF ENGINEERING APPLICATIONOF PROJECTION OF SOLIDS IS SECTION OF SOLIDS.

Hidden features of an object are shown using dotted lines in their projected views

When there are too many hidden features, it becomes difficult to visualize the object

In such cases one usually shows a sectioned view of the solid — the view obtained by virtually cutting the solid by a plane called the section (cutting) plane and removing the part between the observer and plane.

Two cutting actions means section planes are recommended.

A) Section Plane perpendicular to Vp and inclined to Hp. (This is a definition of an Aux. Inclined Plane i.e. A.I.P.)

NOTE:- This section plane appears as a straight line in FV.

B) Section Plane perpendicular to Hp and inclined to Vp.(This is a definition of an Aux. Vertical Plane i.e. A.V.P.)

NOTE:- This section plane appears as a straight line in TV.

Remember:-

1. After launching a section plane either in FV or TV, the part towards observer is assumed to be removed.

2. As far as possible the smaller part is assumed to be removed.

Sectional Views

CUTTING PLANE

CUTTING PLANE LINE

SECTION LINING

FULL SECTIONS

HALF SECTIONS

BROKEN OUT SECTIONS

REVOLVFD SECTIONS

OFFSET SECTIONS

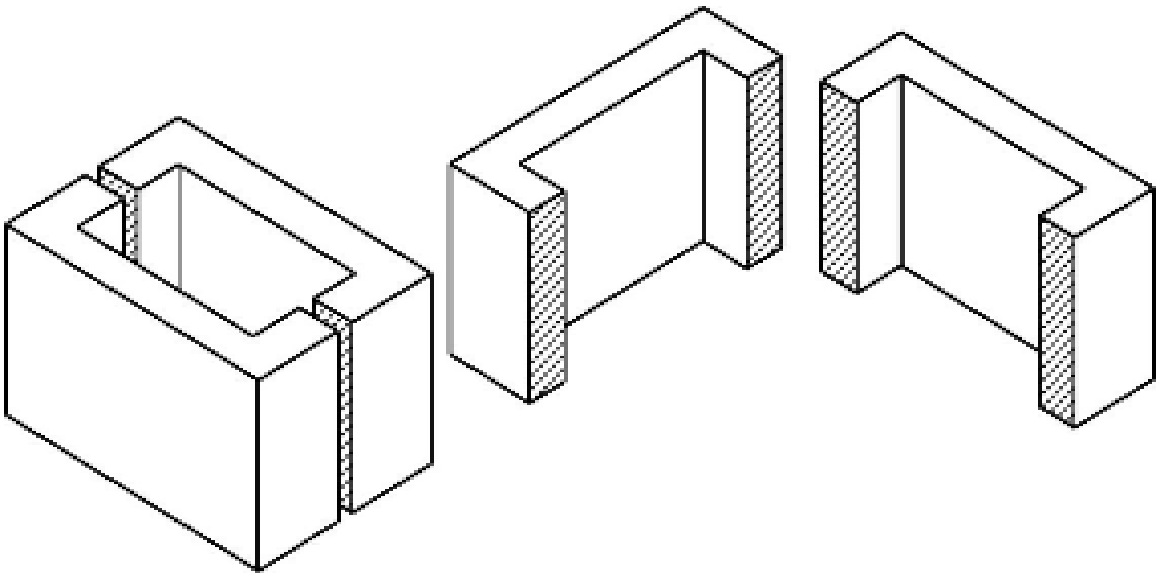
REMOVED SECTIONS

You have learned that when making a multiview sketch, hidden edges and surfaces are usually shown with hidden (dash) lines.

When an object becomes more complex, as in the case of an automobile engine block, a clearer presentation of the interior can be made by sketching the object as it would look if it were cut apart. In that way, the many hidden lines on the sketch are eliminated.

The process of sketching the internal configuration of an object by showing it cut apart is known as sectioning. Sectioning is used frequently on a wide variety of Industrial drawings.

In this example, blocks A and B result after the block in figure 1 has been Sectioned. When you cut an apple in half you have sectioned it. Just as an apple can be sectioned any way you choose, so can an object in a sectional view of a drawing or sketch.



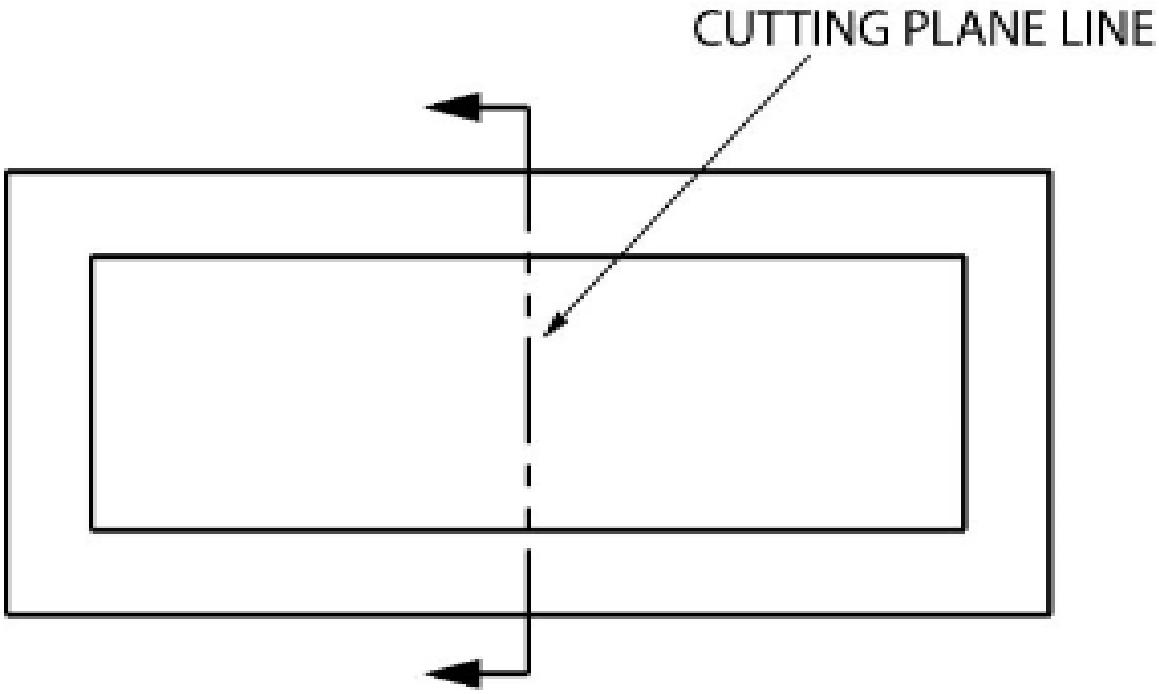
Cutting Plane

A surface cut by the saw in the drawing above is a cutting plane. Actually, it is an

imaginary cutting plane taken through the object, since the object is imagined as being cut through at a desired location.

Cutting Plane Line

A cutting plane is represented on a drawing by a cutting plane line. This is a heavy long-short-short-long kind of line terminated with arrows. The arrows in show the direction of view.



Section Lining.

The lines in the figure above, which look like saw marks, are called section lining. They are found on most sectional views, and indicate the surface which has been exposed by the cutting plane. Notice that the square hole in the object has no section lining, since it was not changed by sectioning.

Different kinds of section lining is used to identify different materials. When an object is made of a combination of materials, a variety of section lining symbols makes materials identification easier. Here are a few examples:

Full Sections.

When a cutting plane line passes entirely through an object, the resulting section is called a full section illustrates a full section.

It is possible to section an object whenever a closer look intentionally is desired. Here is an object sectioned from two different directions.

Half Sections.

If the cutting plane is passed halfway through an object, and one-quarter of the object is removed, the resulting section is a half section. A half section has the advantage of showing both inside and outside configurations.
It is frequently used for symmetrical objects. Hidden lines are usually not shown on the un-sectioned half unless they are needed for clearness or for dimensioning purposes. As in all sectional drawings, the cutting plane take precedence over the center line.

Broken Out Sections

In many cases only a small part of a view needs to be sectioned in order to show some internal detail. In the figure below, the broken out section is removed by a freehand break line. A cutting plane line does not need to be shown, since the location of the cut is obvious.

Revolved Sections.

A revolved section shows the shape of an object by rotating a section 90 degrees to face the viewer. The three revolved sections illustrated in the spear-like object of figure 12 show the changes that take place in its shape.

Offset Sections.

An offset section is a means of including in a single section several features of an object that are not in a straight line. To do this, the cutting plane line is bent, or OFFSET to pass through the features of the part.

Removed Sections.

A section removed from its normal projected position in the standard arrangement of views is called a removed section. Such sections are labeled SECTION A-A, SECTION B-B, etc., corresponding to the letter designation at the ends of the cutting plane line.
Removed sections may be partial sections and are often drawn to a different scale.