

Types of views in engineering drawing



INTRODUCTION:

Engineering drawings are often referred to as “ Blueprints” . However, the terms are becoming an anachronism since most copies of engineering drawings that were made using a chemical-printing process that yielded graphics on blue-coloured paper or of blue-lines on have been superseded by more modern reproduction processes that yield black or multicolour lines on the white paper. The more generic term “ Print” is in common usage in the U. S. to mean any paper copy of the engineering drawing.

It can now be produced using computer technology. Drawings are extracted from 3-dimensional computer models and can be printed as 2-dimensional drawings on various media formats . Engineered computer models can also be printed in 3-dimensional form using special 3D printers.

The process of producing engineering drawing , and the skill of producing , is often referred to as technical drawing , although technical drawings are also required for disciplines that would not ordinarily be thought as parts of engineering.

ENGINEERING DRAWING

The engineering drawing is a type of technical drawing , created within the technical drawing discipline , and is used to define the requirements for engineered items.

It is usually created in accordance with standard conventions for layout, nomenclature , interpretation , appearance , etc. One such standard convention is called GD & T .

The purpose of engineering drawing is to capture all the geometric features of a product or a component accurately and unambiguously. Its end goal is to convey the information that will allow a manufacturer to produce that component.

Engineering Drawings : Common Features

Geometry-shape of the object ; represented as views and how the object will look when viewed from various standard directions , such as front , top , side, etc.

Dimensions –size of the object captured in accepted units .

Tolerances –allowable variations for every dimension .

Material –represents what the item is made of .

Finish –specifies the surface quality of item, functional or cosmetic.

Different types of projections:

- Orthogonal projection
- Auxiliary projection
- Isometric projection
- Oblique projection
- Perspective projection

ORTHOGRAPHIC PROJECTION

Orthographic projection is a way of representing a 3-dimensional object in two dimensions. It is a form of parallel projection , here the view direction is orthogonal to the projection plane, resulting in each plane of the scene

appearing in affine transformation on viewing surface. It is further divided into Multiview Orthographic projections and Axonometric projection.

This projection shows that the object as it looks from the front, right, left, top, bottom, or back, and are positioned relative to each other according to the rules of either first-angle or third-angle projection.

§ First-angle projection is the ISO standard and is primarily used in Europe. The 3-D object is projected into 2-D “ paper” space as if you were looking at an X-ray of object : top view is under the front view, the right view is at the left of the front view.

§ Third-angle projection is primarily used in the United States and Canada, where it is a default projection system according to BS 8888: 2006, the left view is placed on left and the top view on the top.

All views are not necessarily used, and determination of surface constitutes the front, back, top and bottom varies depending on projection used.

Multiview Orthographic Projections

With this projection, upto six pictures of an object are produced, with each projection plane parallel to one of the co-ordinate axes of object. The views are positioned relative to each other according to either of two schemes – first angle or third angle projection. The appearances of views may be of as being projected onto planes that form a six-sided box around the object.

Although six different sides can be drawn three sides of a drawing give enough information to make a three-dimensional object. All these views are known as front view, top view and right side view.

AUXILIARY PROJECTIONS

The auxiliary view is an orthographic view that is projected into any plane other than one of the 6 principal views. The views are used when an object contains some sort of the inclined plane. Using the auxiliary view allows for inclined plane to be projected in true size and shape. The true size and shape of any feature in a technical drawings can only be known when the Line of Sight is perpendicular to the plane which is considered as reference.

Drawing Auxiliary Views

Despite of the fact that auxiliary views are projected onto planes which are inclined to the principal projection planes , they are still classified as orthographic-views. The LOS are still parallel to each other and perpendicular to the plane of projection . Thus when reading lines on the object in this view adjacent to a principal view , the same rules apply to reading lines in adjacent principal-views.

To utilize this view to show a surface true size , a view must exist or be drawn where that surface appears as a line . It is not possible to show an oblique surface in a primary auxiliary view. Once a given view showing the surface as a line is identified.

Complete auxiliary views are not commonly drawn in industry. It is much more common to see partial auxiliary-views that show only TS features. Since most of the other surfaces will be fore-shortened , a complete auxiliary-view becomes more difficult to read .

Isometric Projection

The isometric projection shows the object from the angles in which the scales along each axis of the object are equal. This projection corresponds to

the rotation of the object by $\pm 45^\circ$ about the vertical axis followed by the rotation of approximately $\pm 35.264^\circ$ about the horizontal-axis starting from an orthographic projection view.

“ Isometric” comes from Greek for “ Same Measure.” One of the things that makes this view of drawing so attractive is the ease with which 60 degree angles can be constructed with a compass and straightedge only.

EXAMPLE:

The following example shows the elevation of a slab of wood having the raised panel. This plane is either turned down into the horizontal plane or is wheeled into the vertical plane.

This projection is a type of axonometric projection. The other two types of axonometric projection are :

- Di-metric Projection
- Tri-metric Projection

Oblique projection

The oblique projection is a simple type of graphical projection used for producing the pictorial and 2-D images of 3-D objects

Example :-

The following example shows the oblique projection of a camera

- This projection projects an image by the intersecting parallel-rays
- From the 3-D source object with drawing surface.

Here in both the oblique-projection and the orthographic-projection , parallel lines of source object produce parallel lines in the projected image.

Perspective Projection

The Perspective projection is the approximate representation on a flat surface , of the image perceived by the eyes. The most characteristic features of this projection are that objects are drawn :

- Smaller as their distance from the observer increases
- Foreshortened : the size of an object's dimensions along the line of sight are relatively shorter than dimensions across the line of sight .

In perspective view of drawing , every set of parallel lines has its own vanishing point . To draw one-point perspective , subjects are arranged so that one set of lines has a vanishing point right in front of us, and the set at right-angles goes out to infinity on each side – parallel , either straight up or straight across.