



Andhra Pradesh State Skill Development Corporation



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AutoCAD(CIVIL)

Basics of Engineering Drawing



INTRODUCTION TO THE COURSE

BASICS OF ENGINEERING DRAWING

Scientists study the world as it is!

Engineers create the world that never has been!!

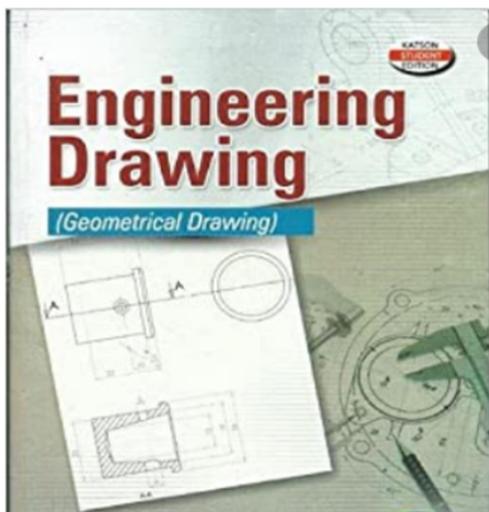
Engineer is derived from the Greek word ingenious!

Ingenious means intelligent/imaginative/innovative/creative!!

Engineering means applied science, i.e., Technology is the technical aspects and concepts of man-made machines, robotics, aeronautics, instruments, etc.

An engineering drawing is a subcategory of technical drawings. The purpose is to convey all the information necessary for manufacturing a product or a part. Engineering drawings use standardised language and symbols. This makes understanding the drawings simple with little to no personal interpretation possibilities.

WHAT IS ENGINEERING DRAWING?



- Drawing**

It is a Graphical representation of an object.

It means describing any object /information diagrammatically.

- Freehand drawing**

The lines are sketched without using instruments other than pencils and erasers engineering drawing.

- Engineering drawing**

A drawing of an object that consists of all information it means like actual shape, actual size, manufacturing methods, etc. required for construction.

Graphical means of expression of technical details without the barrier of a language No construction/ manufacturing of any (man-made) engineering objects is possible without Diagrams/ sketches / pictures communication skills.



1. We grasp information easily if it is illustrated with diagrams, sketches, pictures, etc.
2. A picture/drawing is worth thousands of words.
3. Drawings are the road.

Classification of engineering drawing:

Engineering drawing will be used in two ways they are

1. Manual drawing

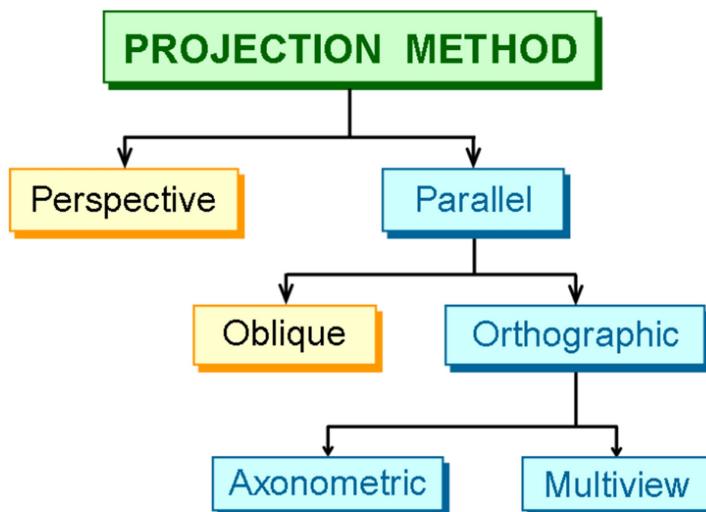
Items required for manual drawing

1. Drawing board
2. Drawing sheet
3. Mini drafter/ drafting machine/ T-square.
4. Instrument box contains a compass, divider etc.
5. Scales
6. Protractor
7. Drawing pencils
8. Drawing clip/pin
9. Eraser

2. Computer drawing

The drawings are usually made by commercial software's such as AutoCAD etc.

Projection theory:



The projection theory is used to graphically represent 3d objects on 2d media (paper, computer screen).

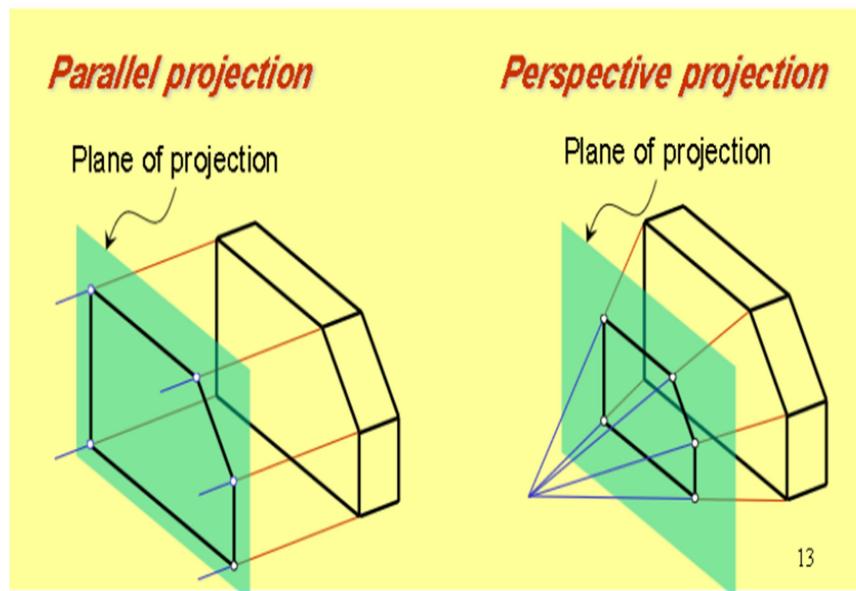
The projection theory is based on two variables

1) Line of sight:

Is an imaginary ray of light between observer eye and object is known as line of sight

Based on line of sights it will be defined 2 types of projections they are

- Parallel projection
- Perspective projection

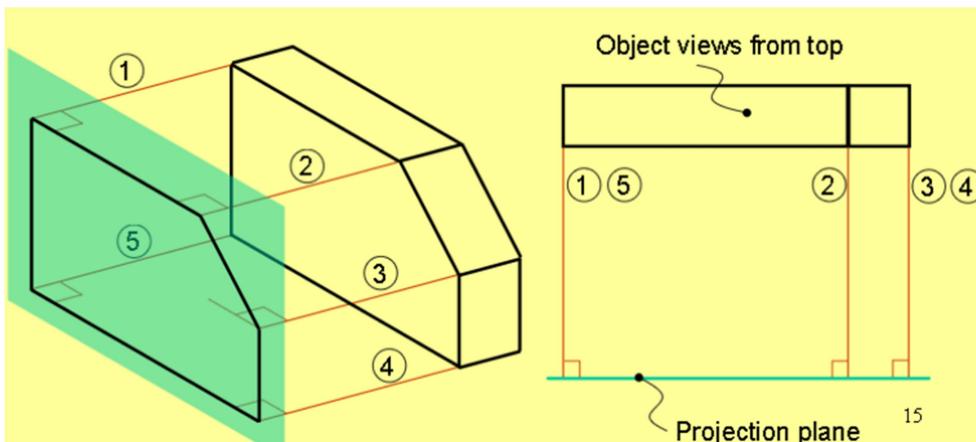


- **Parallel Projection:**

Projection lines are parallel to the Plane of Projection.

- Orthographic Projection:

The projection lines intersect the plane at a perpendicular angle.



Orthographic projection: is a parallel projection technique in which the parallel lines of sight are perpendicular to the projection of plane.

Orthographic view depends on relative position of the object to the line of sight
Orthographic projection technique can produce either 2 ways they are

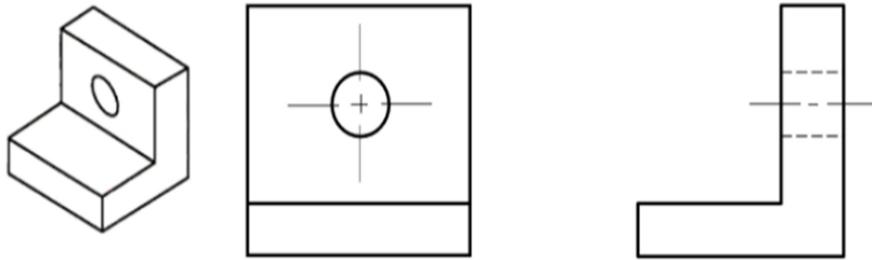
- Multi view drawing

Each view shown an object as two dimensions.

Advantage: it represents accurate shape and size.

Disadvantage: require practice in writing and reading.

Example: multi view drawing (2- view drawings).



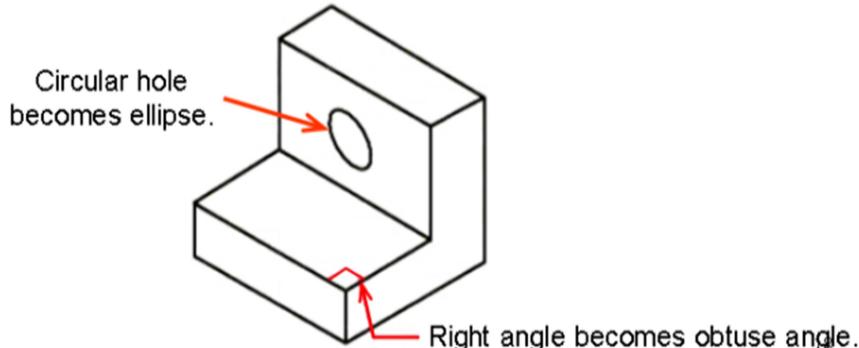
- Axonometric drawing (isometric)

That shows all three dimensions of an object in one view.

Advantage: easy to understand.

Disadvantage: shape and angle distortion.

Example: distortions of shape and size in isometric drawing.



- Oblique Projection:

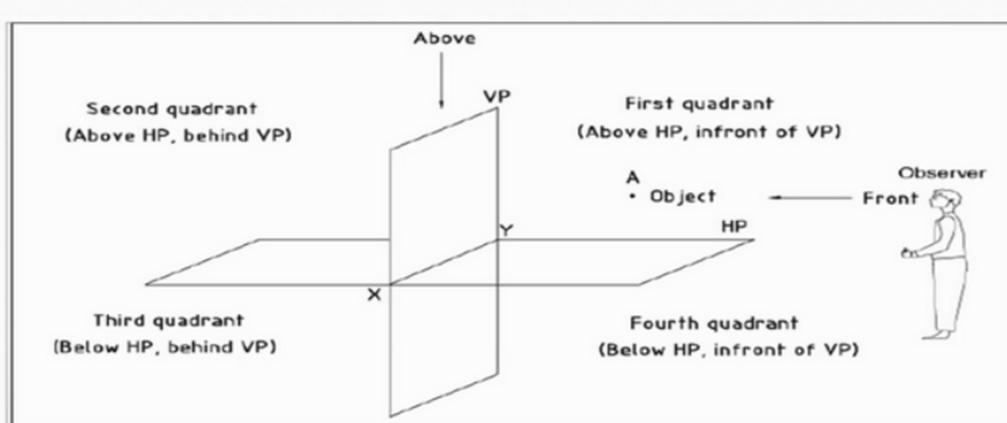
Projected with an angle with respect to the plane and we can project 3D view on 2D plane of Projection.

- Perspective Projection :

We can draw actual object visually in a realistic view on plane.

Perspective projection is not used by engineer because,

- It is difficult to create.
- It does not reveal exact shape and size.

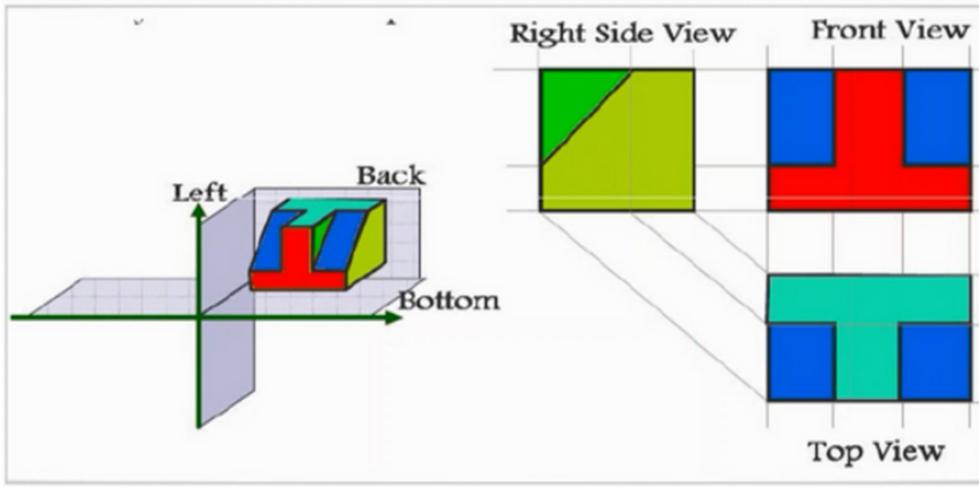




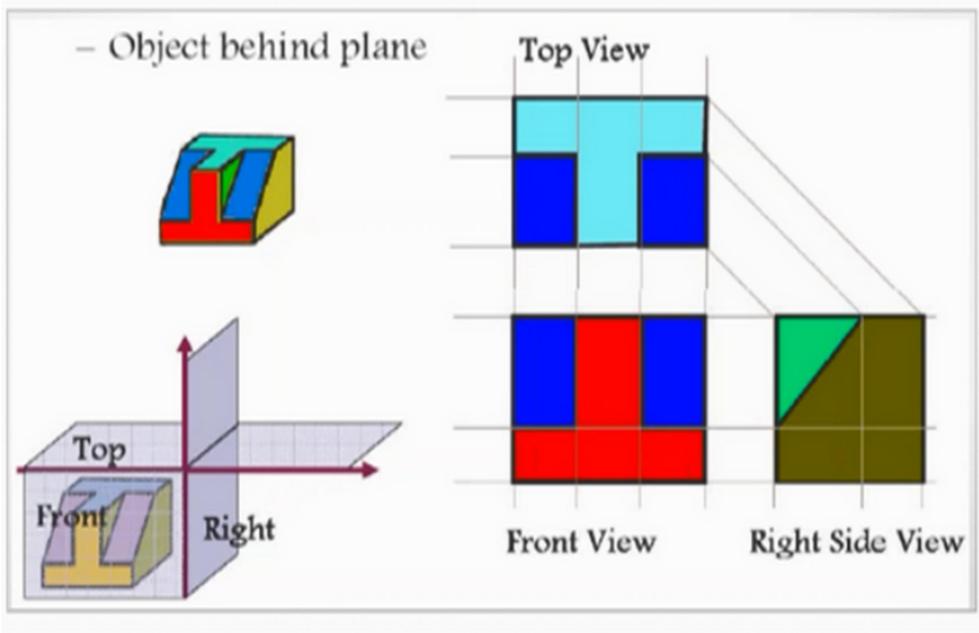
2) Plane of projection:

Is an imaginary flat plane which the image is created is known as a plane of projection.
Popular only two types of projections.

First angle projection



Third angle projections





DIFFERENCE BETWEEN FIRST ANGLE AND THIRD ANGLE PROJECTIONS:

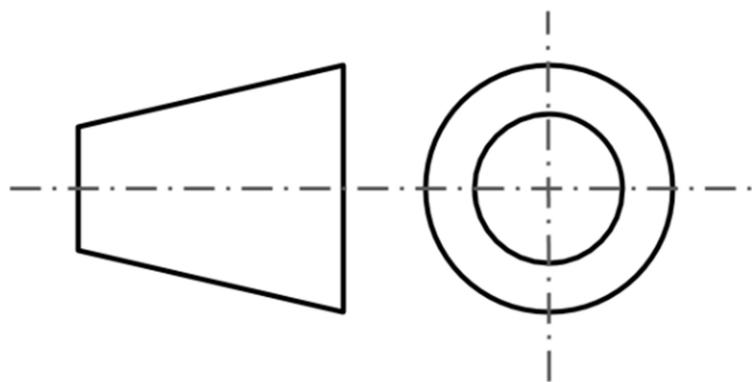
The orthographic projection system is used to represent a 3D object in a 2D plane. The orthographic projection system utilizes parallel lines to project 3D object views onto a 2D plane. According to the rule of orthographic projection. To draw a projection view of a 3D object on a 2D Plane. The horizontal plane is rotated in the clockwise direction.

Types of Orthographic projection systems are first angle and third angle projection.

1. First Angle Projection:

In the first angle projection, the object is placed in the 1st quadrant. The object is positioned at the front of a vertical plane and top of the horizontal plane. First angle projection is widely used in India and European countries. The object is placed between the observer and projection planes. The plane of projection is taken solid in 1st angle projection.

Symbol –



2. Third Angle Projection:

In the third angle projection, the object is placed in the third quadrant. The object is placed behind the vertical planes and bottom of the horizontal plane. Third angle projection is widely used in the United States. The projection planes come between the object and observer. The plane of projection is taken as transparent in 3rd angle projection.



Symbol –

