



Lecture 5

Projection Methods

By

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PROJECTION THEORY

- In engineering, 3-dimensional objects and structures are represented graphically on a 2-dimensional media (paper, screen).
- The act of obtaining the image of an object is termed “projection”. The image obtained by projection is known as a “view”.

PROJECTION THEORY

The projection theory is based on two variables:

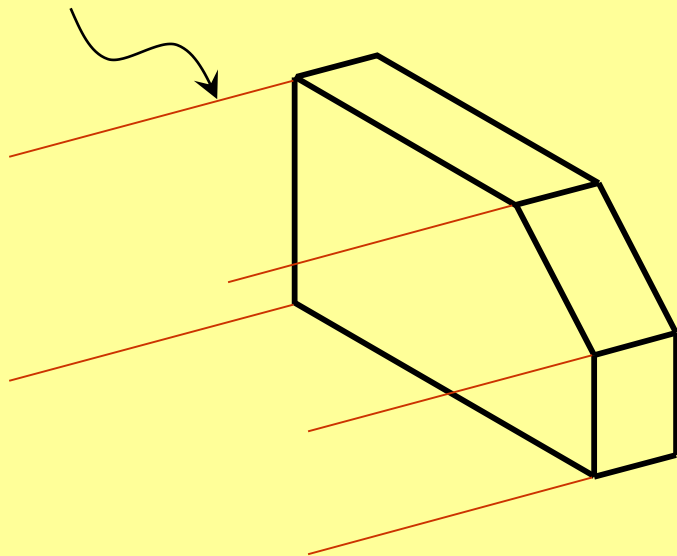
- 1) Line of sight
- 2) Plane of projection (image plane or picture plane)

Line of sight is an imaginary ray of light between an observer's eye and an object.

- There are 2 types of LOS : parallel and converge

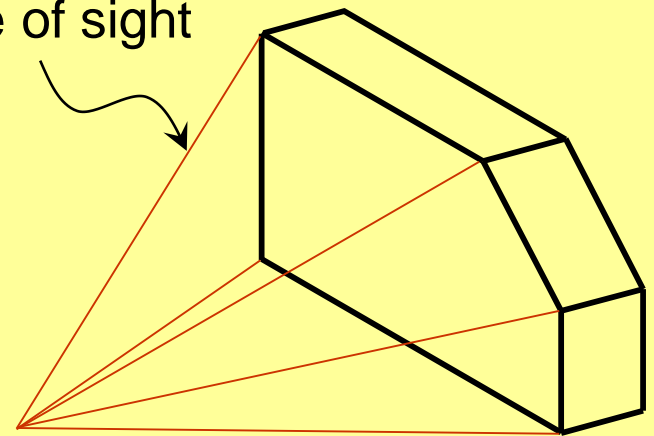
Parallel projection

Line of sight



Perspective projection

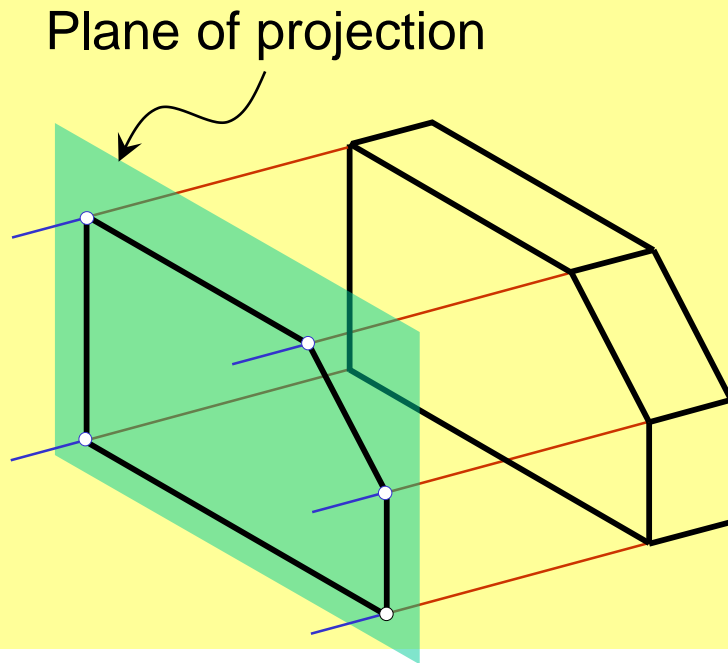
Line of sight



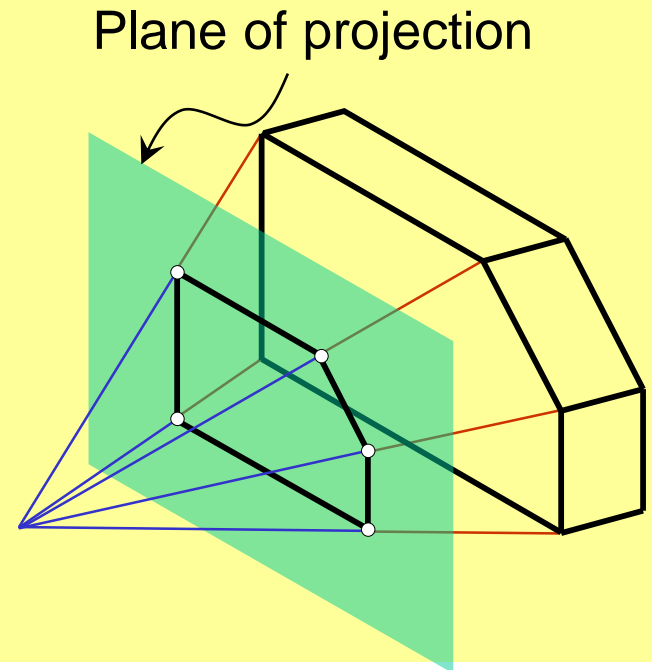
Plane of projection is an imaginary flat plane on which the image is created.

- The image is produced by connecting the points where the LOS pierce the projection plane.

Parallel projection



Perspective projection



Disadvantage of Perspective Projection

Perspective projection is *not* used by professional designers for manufacturing of parts, because

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

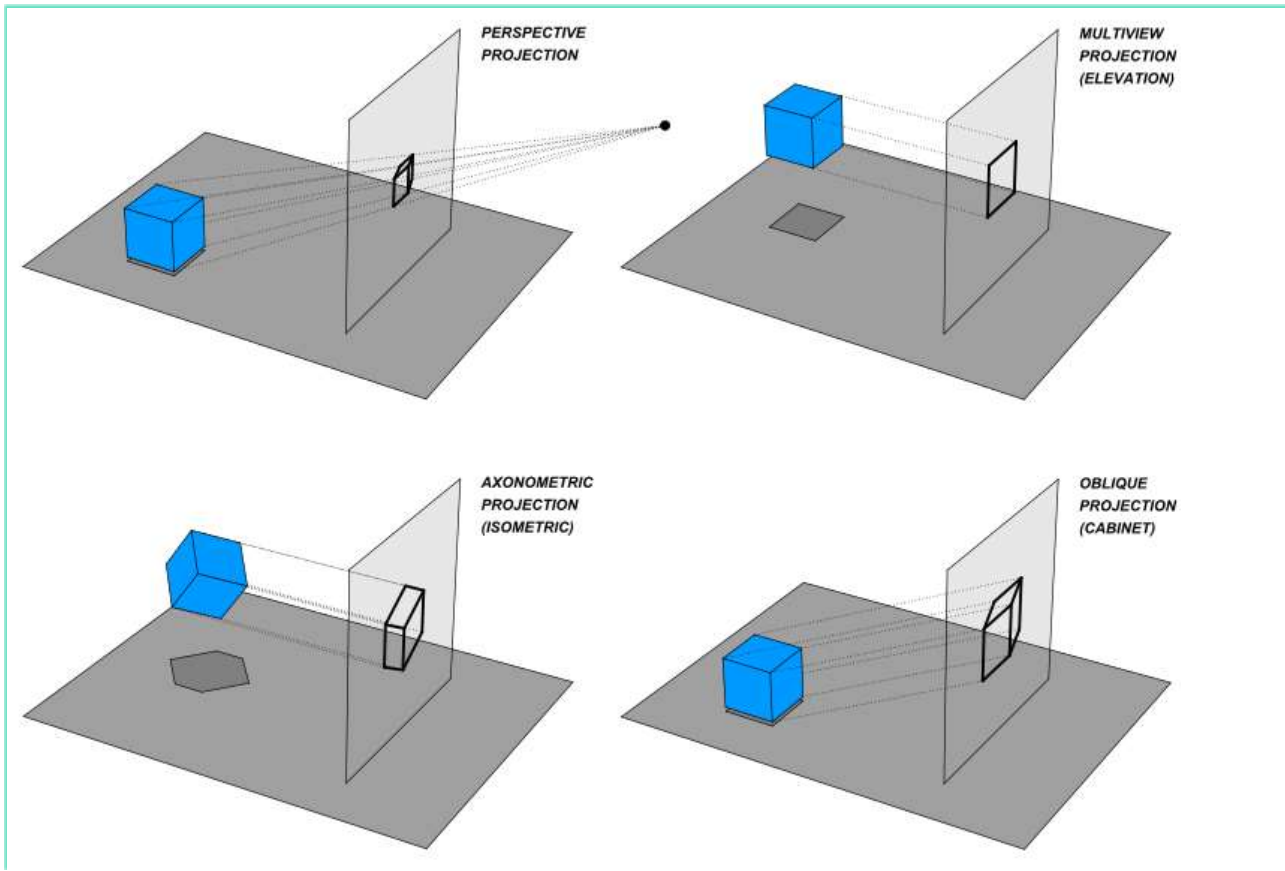


Methods of Projection

In Engg. Drawing four most common methods of projection (Based on LOS and POP) used are:

1. Orthographic
2. Oblique
3. Isometric
4. Perspective

Methods of Projection



Orthographic Projection

- Dedicated Lecture.

Isometric Projection

- An isometric projection shows the object from angles in which the scales along each axis of the object are equal.
- Isometric projection corresponds to rotation of the object by $\pm 45^\circ$ about the vertical axis, followed by rotation of approximately $\pm 35.264^\circ$ about the horizontal axis starting from an orthographic projection view.

Perspective Projection:

- Perspective is an approximate representation on a flat surface, of an image as it is perceived by the eye. The two most characteristic features of perspective 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.

Oblique Projection

- Oblique projection is a type of parallel projection:
- it projects an image by intersecting parallel rays (projectors) from the three-dimensional source object with the drawing surface (projection plane)

ORTHOGRAPHIC VIEW

Orthographic view depends on relative position of the object to the line of sight.

Two dimensions of an object is shown.

More than one view is needed to represent the object.

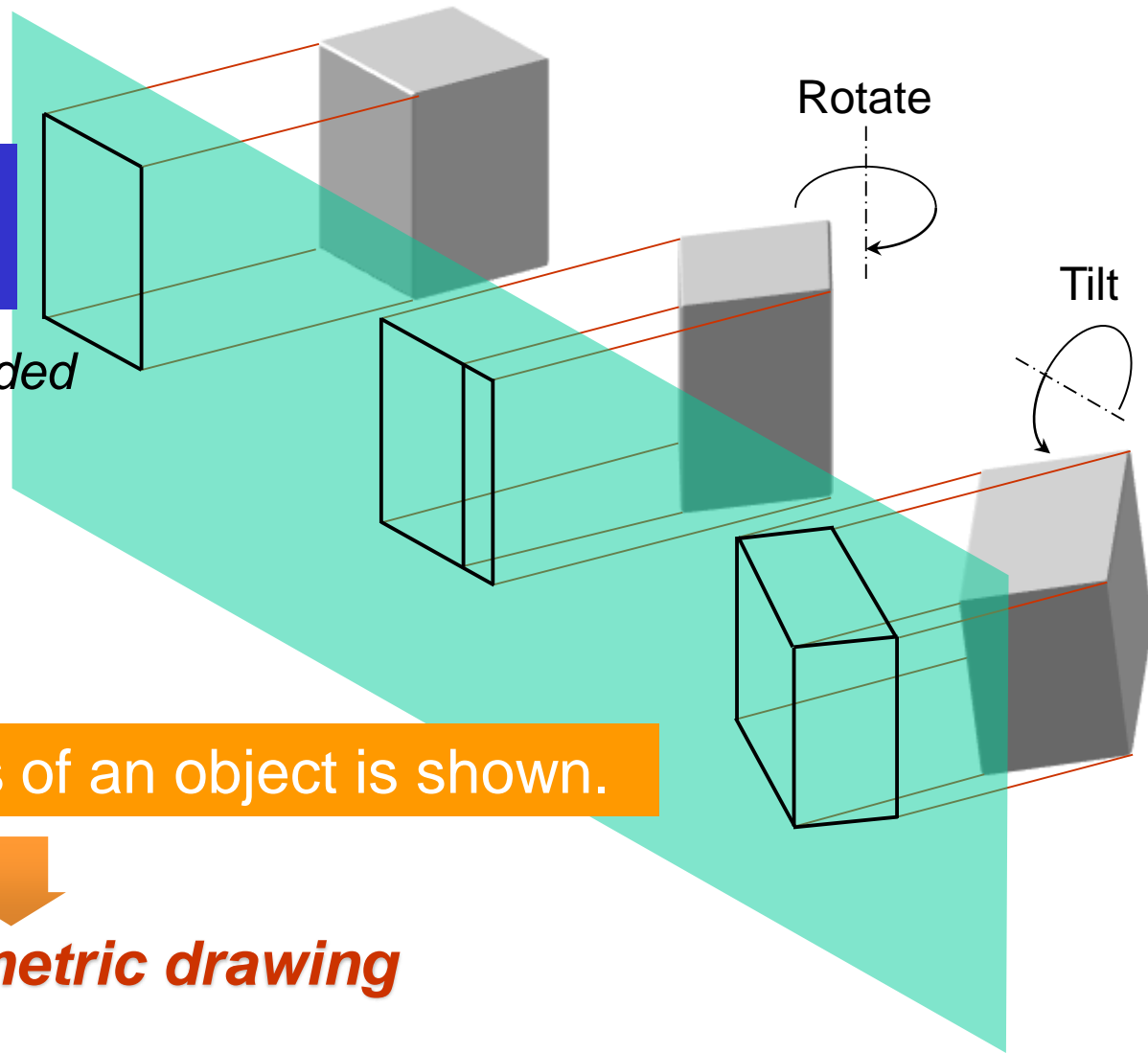


Multiview drawing

Three dimensions of an object is shown.



Axonometric drawing

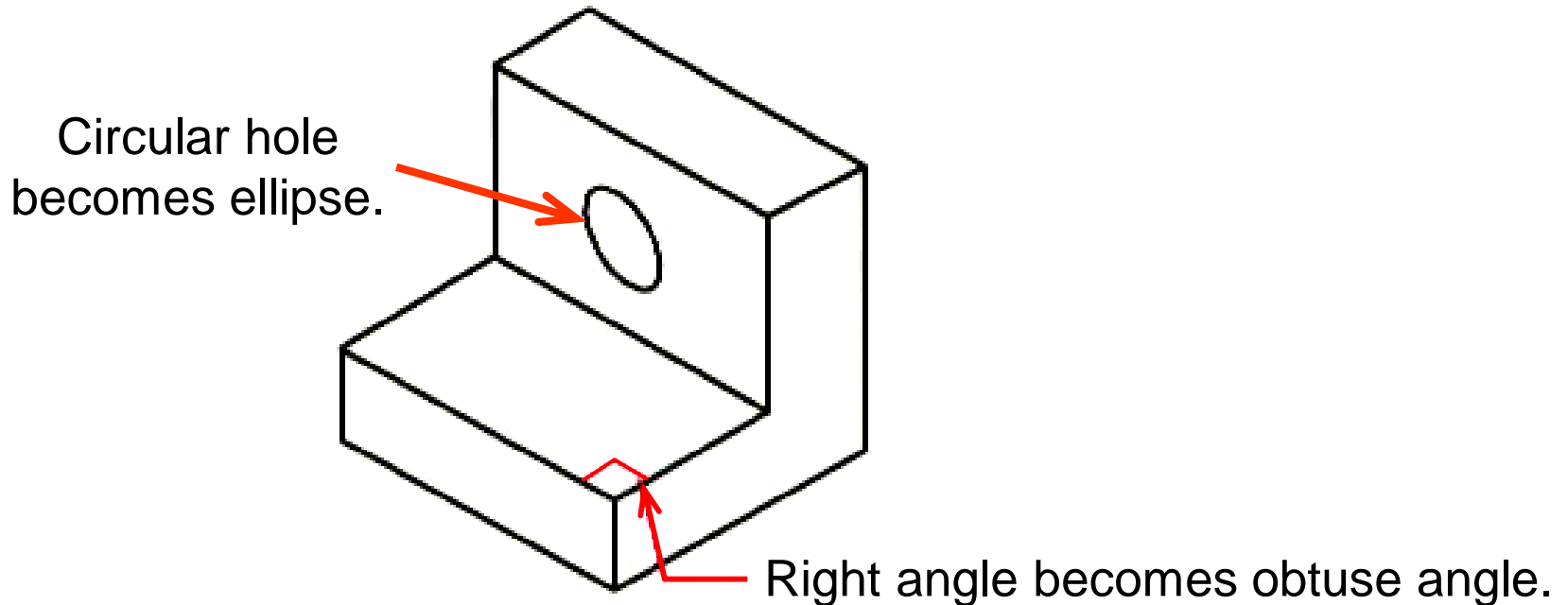


Isometric Drawing

Advantage Easy to understand

Disadvantage Shape and angle distortion

Example Distortions of shape and size in isometric drawing



Multiview Drawing

Advantage It represents accurate **shape and size**.

Disadvantage Require practice in writing and reading.

Example Multiviews drawing (2-view drawing)

