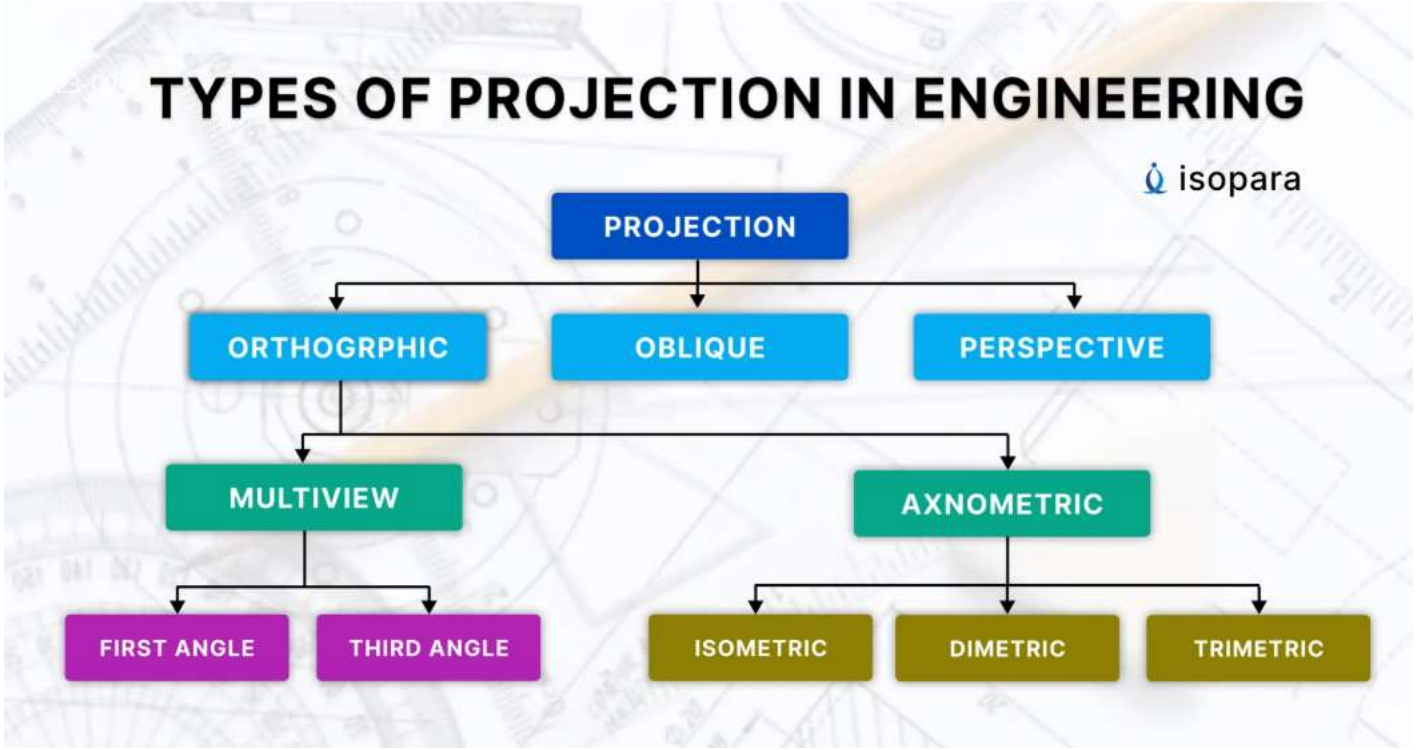
Orthographic Projection in Architecture

Understanding Principal Views, Projection Methods, Hidden Lines, Sectional Views, and Applications

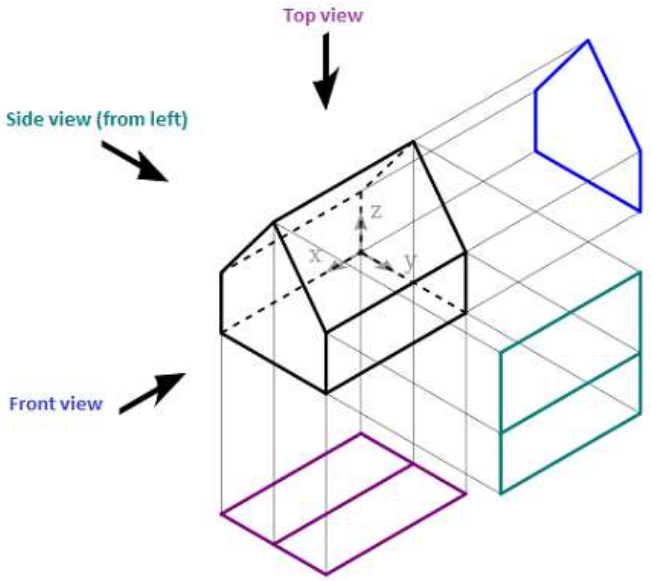
Types Of Projection In Engineering | First Angle And Third Angle Projection

In engineering, projections are graphical techniques used to represent three-dimensional objects or spaces on a two-dimensional surface. These projections are crucial for design, analysis, and communication in various fields of engineering, such as mechanical engineering, civil engineering, and architecture.



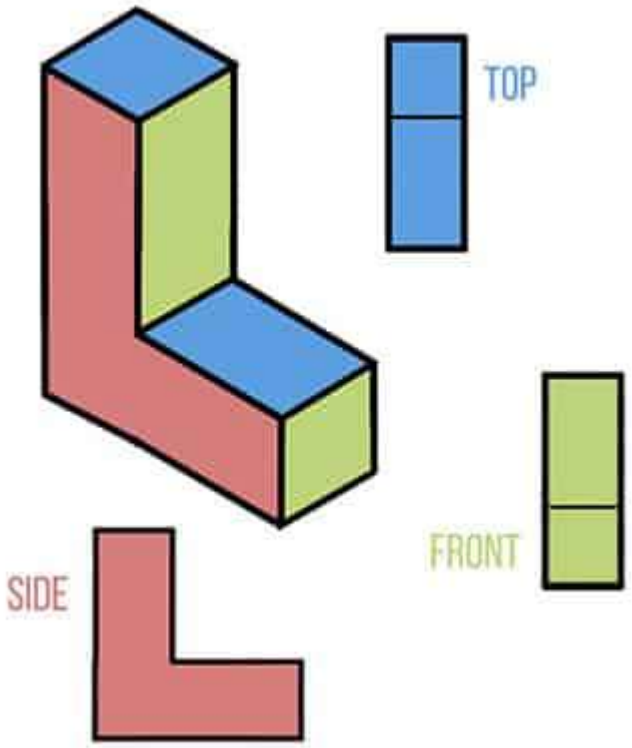
1. Introduction to Orthographic Projection

- Orthographic projection is a method of representing three-dimensional objects in two dimensions. It involves drawing the object from multiple angles, typically from the top, front, and side views.



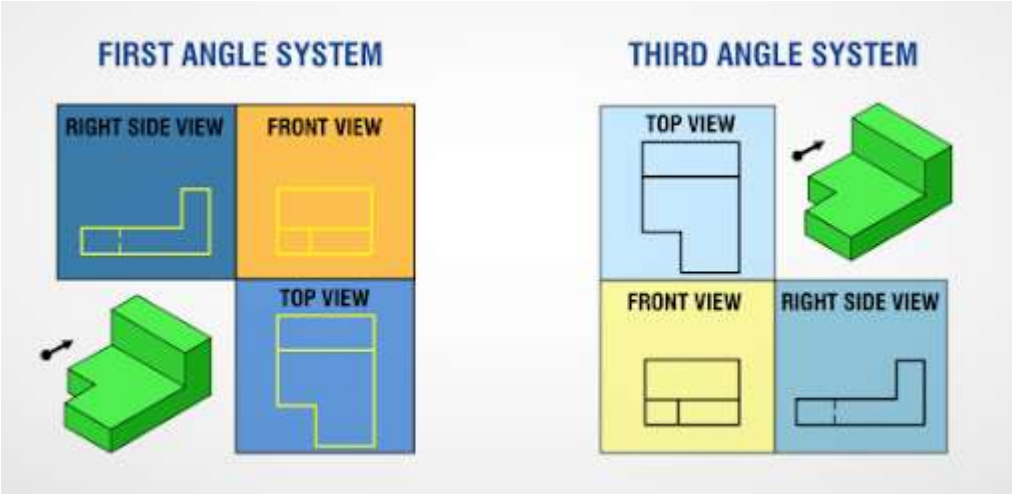
2. Principal Views

- The principal views in orthographic projection are the top, front, and side views, also known as plan, elevation, and profile. These views provide different perspectives of an object, and each shows different dimensions. In architectural design, these views are essential for communicating the design of a structure clearly.



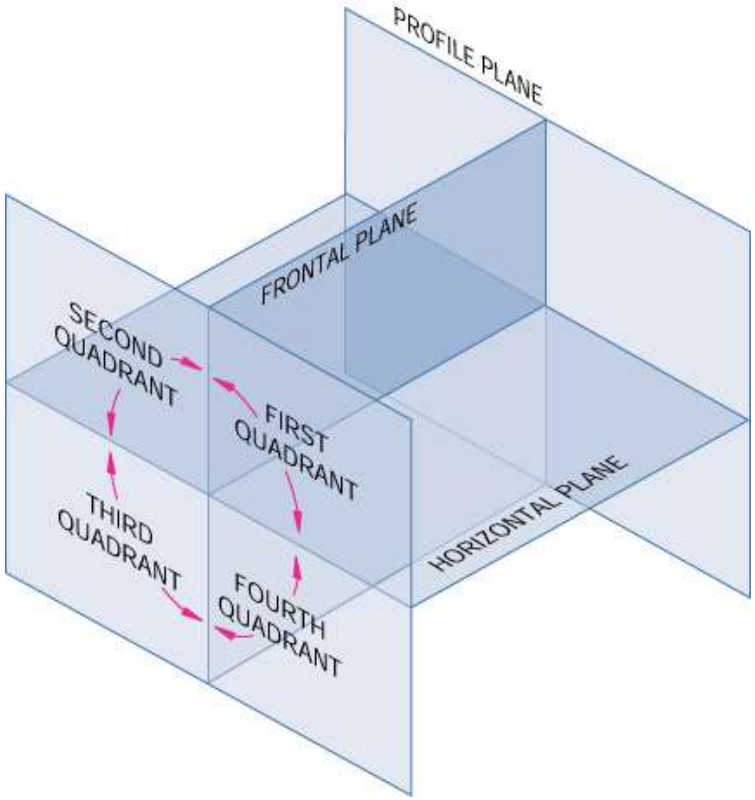
Projection Methods: First and Third Angle

- There are two primary methods for creating orthographic projections: first-angle and third-angle projection. Each method determines the arrangement of views differently. First-angle projection is common in Europe, while third-angle is used in the U.S.



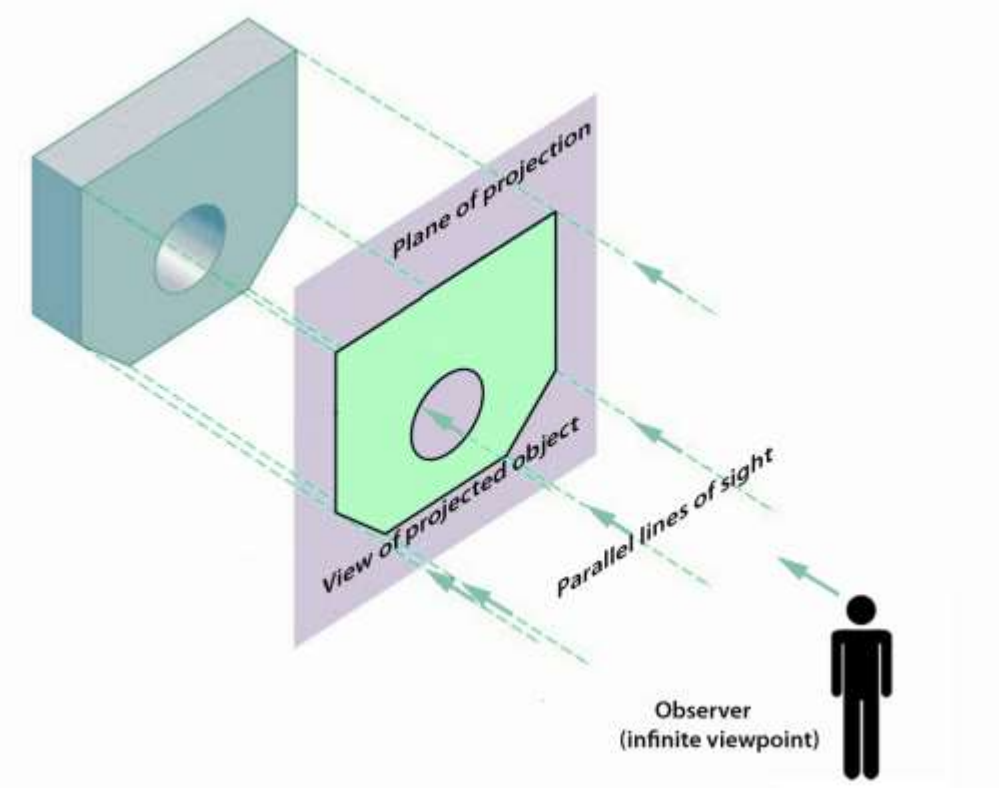
3. Top View

- The top view is the projection of the object as seen from directly above.



4. Front View

- The front view is the projection of the object as seen from directly in front.

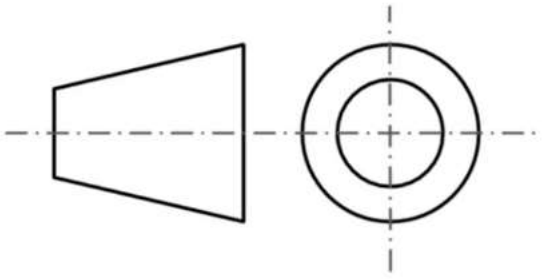


5. Side View

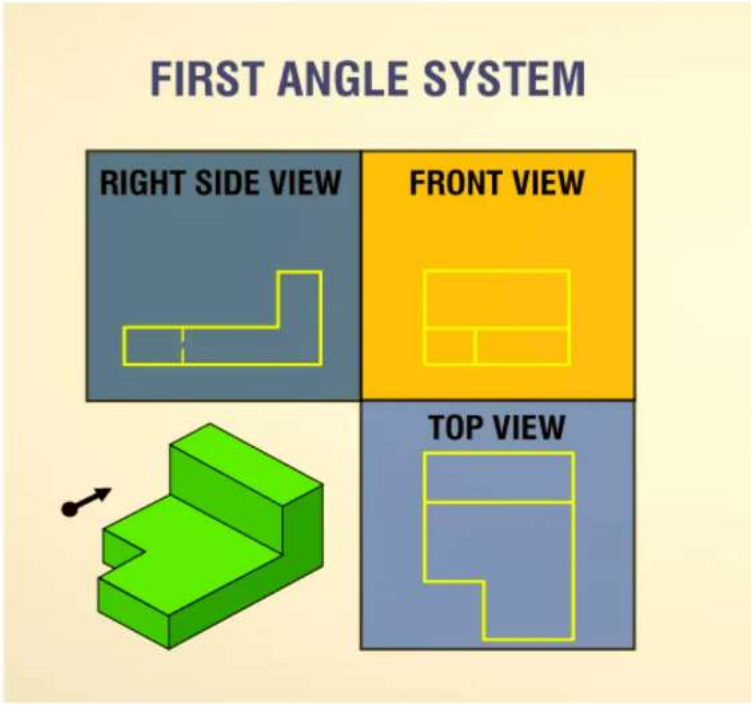
- The side view is the projection of the object as seen from the side.

6. First-Angle Projection

- In first-angle projection, the object is placed in the first quadrant. The views are arranged with the top view at the top, front view in the middle, and right-side view to the right.

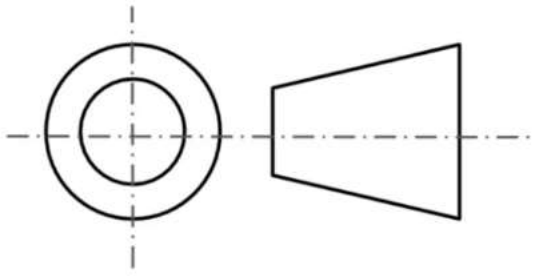


Symbol of 1st Angle

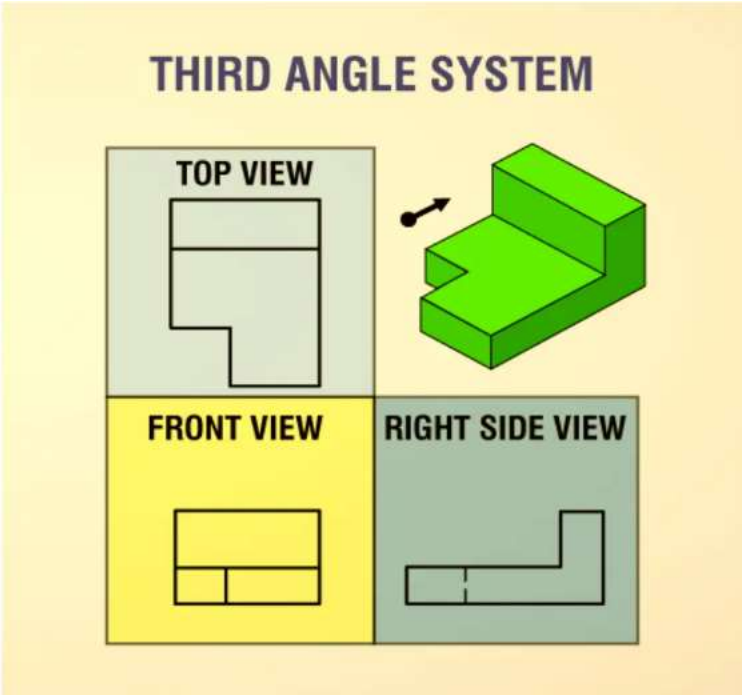


7. Third-Angle Projection

- In third-angle projection, the object is placed in the third quadrant. The views are arranged with the front view at the center, top view above, and right-side view to the right.

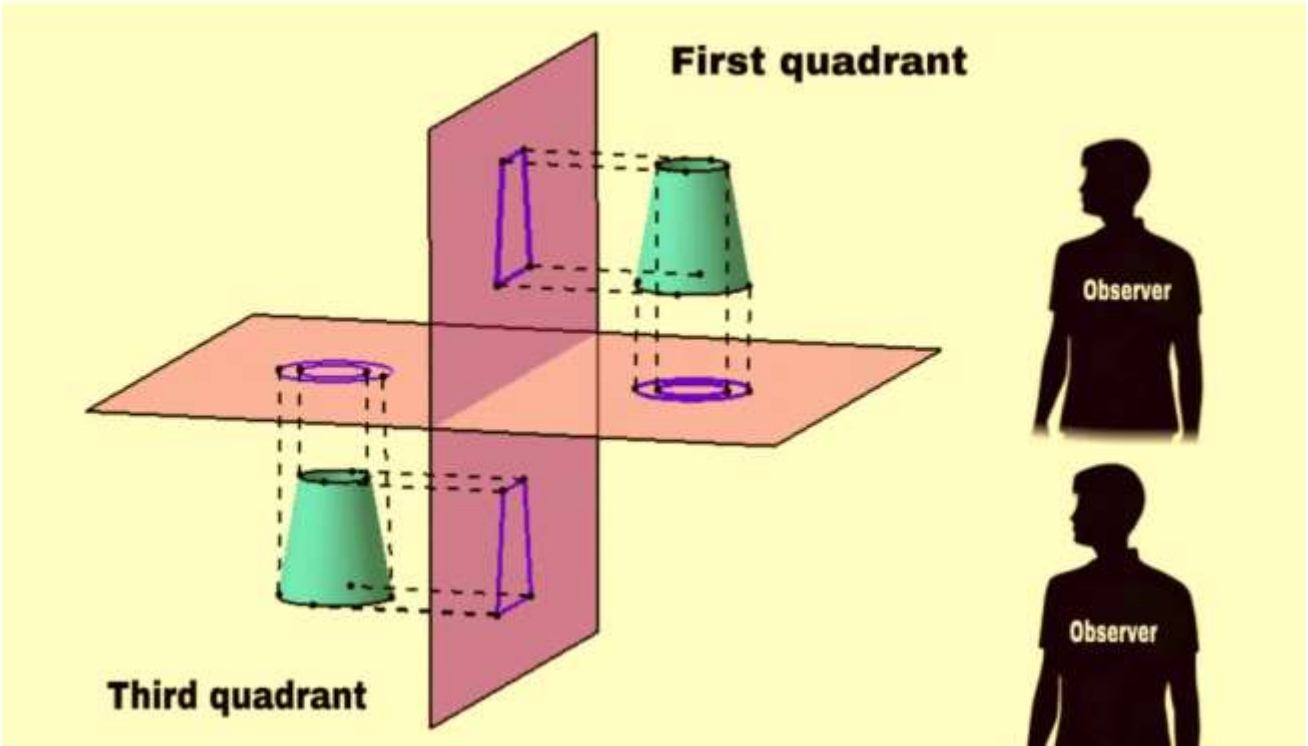


Symbol of 3rd Angle



8. Comparison of First and Third-Angle Projection

- The key difference between first and third-angle projection lies in how the views are positioned relative to each other.



9. Hidden Lines

- Hidden lines represent features of the object that are not visible in a particular view. They are usually drawn as dashed lines.

The object is imagine to be first quadrant	The object is imagine to be in third quadrant.
The object lies between the observer and a plane of projection	Here the plane of projection lies between the object and observer.
The plane of projection assumed to be a non transparent.	In third angle plane of projection assumed to be a transparent.
When view are drawn in their relative position top view comes below front, right side view drawn to the left side of the elevation.	When view are drawn in their relative position top view comes above front view , right side view drawn to the right side of the elevation.

10. Sectional Views

- Sectional views are used to show internal details of an object by cutting through it. These views help to visualize internal components.

11. Architectural Applications of Orthographic Projection

- Orthographic projections are essential in architectural drawings for representing buildings and structures. They provide a clear and accurate representation of dimensions and spatial relationships.

12. Example of Architectural Drawing

- An example of an architectural orthographic projection showing a floor plan and elevation views.

13. Exercise Introduction

- In this exercise, you will create orthographic projections of a simple architectural form.

14. Exercise Guidelines

- Begin by sketching the object from different perspectives: top, front, and side. Then, create the orthographic projections based on the views.

15. Step 1: Sketching the Object

- Start by sketching the object from the top, front, and side. This will help you understand the relationships between the views.

16. Step 2: Drawing the Top View

- Draw the object in the top view. Ensure that the proportions and placement of the object are correct.

17. Step 3: Drawing the Front View

- Draw the object in the front view, showing the height and width of the object.

18. Step 4: Drawing the Side View

- Draw the object in the side view, showing the depth and height of the object.

19. Step 5: Aligning the Views

- Align the views accurately so that all features are correctly positioned in relation to each other.

20. Step 6: Adding Hidden Lines

- If there are hidden features, add dashed lines to the projections to represent these features.

21. Step 7: Adding Sectional Views (if necessary)

- For complex objects, consider using sectional views to show internal details.

22. Step 8: Finalizing the Drawing

- Ensure that the views are clearly labeled, with dimensions and notes included where necessary.

23. Tools for Creating Orthographic Projections

- Common tools for creating orthographic projections include drawing software (CAD) and manual drafting tools.

24. Importance of Accuracy

- Accuracy in orthographic projection is essential to ensure that the drawing is a true representation of the object.

25. Common Mistakes in Orthographic Projections

- Common mistakes include misalignment of views, incorrect scaling, and improper representation of hidden lines.

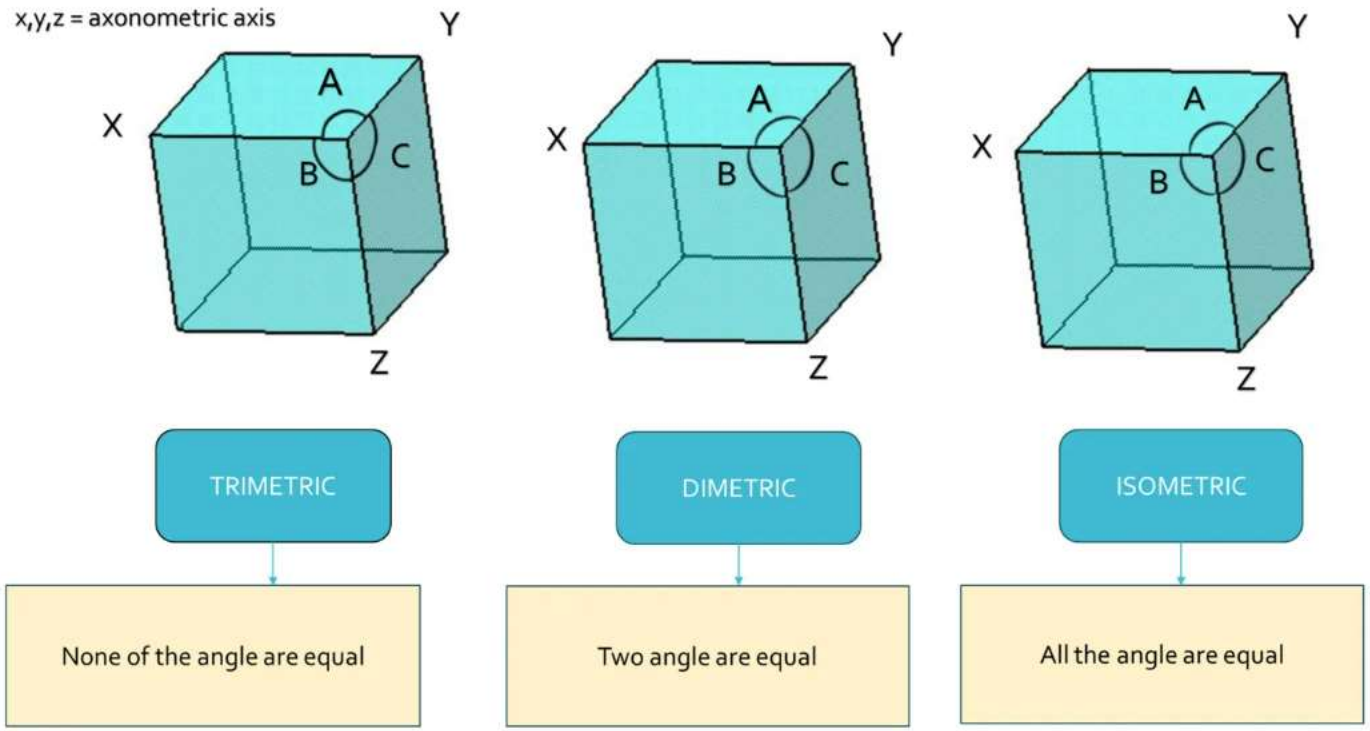
26. Summary of Key Points

- In summary, orthographic projection involves using multiple views (top, front, side) to represent a three-dimensional object. Hidden lines and sectional views are important for clarity.

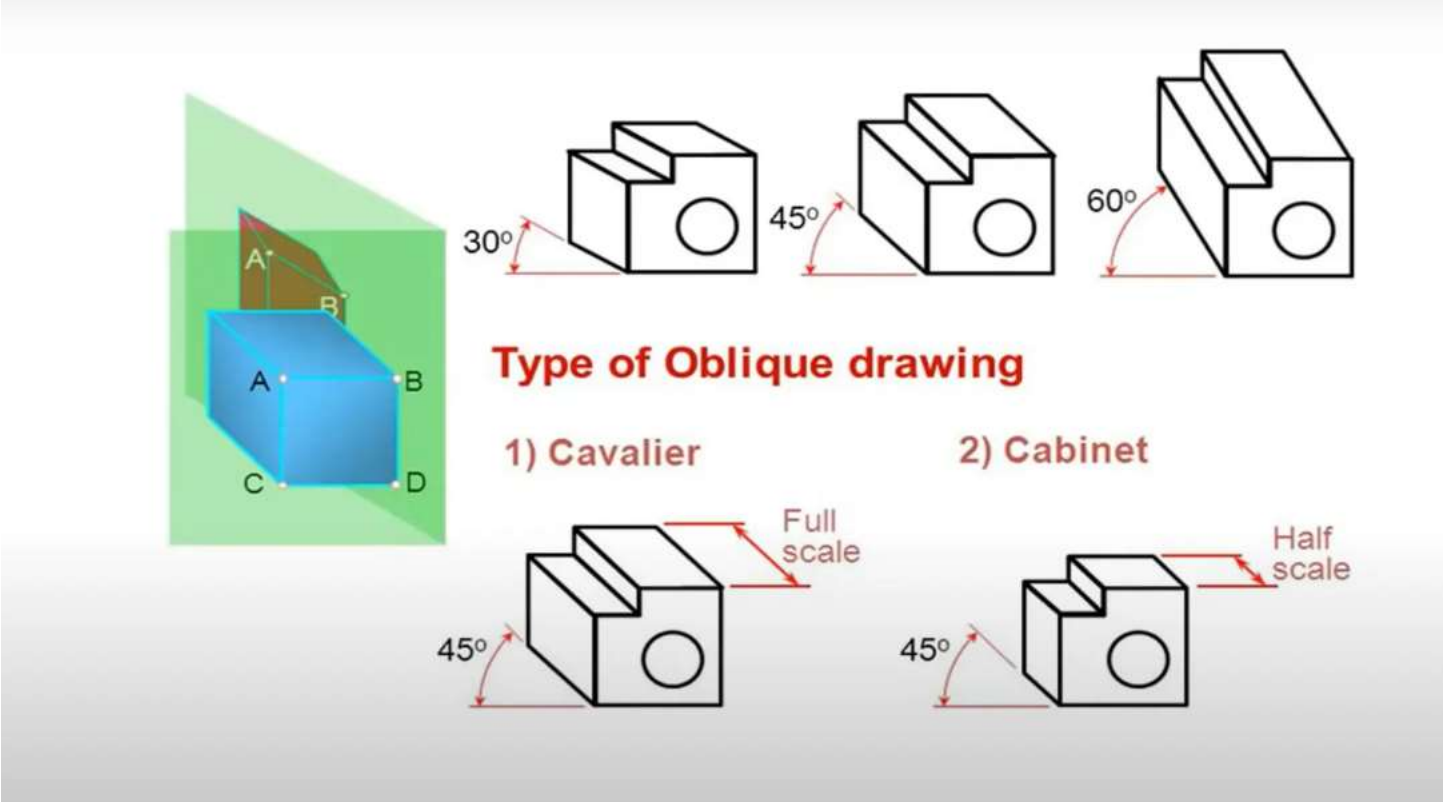
27. Application in Architecture

- Orthographic projections are used in architecture to represent buildings, floor plans, and elevations, providing a clear view of spatial relationships.

28. **Axonometric projection**



OBLIQUE PROJECTION



29. Review and Practice

- Practice is essential in mastering orthographic projection. Review the steps and create additional projections of simple forms.

30. Conclusion

- Orthographic projection is a crucial skill in architecture. Understanding the principal views, projection methods, and the use of hidden lines will enhance your ability to communicate design ideas effectively.

ENGINEERING DRAWING

Engineering drawing is a graphical language, a concept developed by a designer in a 2D paper with the required features, attributes, and dimensions.

Here are some common types of mechanical engineering drawings:

Orthographic Drawings: These are the most fundamental mechanical drawings, showing the object from different views (front, top, side, etc.) to provide a clear and comprehensive representation.

Isometric Drawings: These drawings represent a 3D object in a 2D format, often at an angle, to provide a more realistic and visually informative view.

Exploded Assembly Drawings: These drawings show an assembly of parts with components separated and spaced apart, making it easier to understand how they fit together.

Sectional Views: Sectional views are used to show the internal structure of an object by cutting it along a specific plane and revealing its hidden features.

Detail Drawings: These drawings provide specific information about a single part or component of a larger assembly. They often include detailed dimensions, tolerances, and notes.

Orthographic Drawings: These are the most fundamental type of mechanical drawings, showing the object from different views (front, top, side, etc.) to provide a clear and comprehensive representation.

Isometric Drawings: These drawings represent a 3D object in a 2D format, often at an angle, to provide a more realistic and visually informative view.
Exploded Assembly Drawings: These drawings show an assembly of parts with components separated and spaced apart, making it easier to understand how they fit together.
Sectional Views: Sectional views are used to show the internal structure of an object by cutting it along a specific plane and revealing its hidden features.
Detail Drawings: These drawings provide specific information about a single part or component of a larger assembly. They often include detailed dimensions, tolerances, and notes.
Pictorial Drawings: These drawings, including axonometric, oblique, and perspective drawings, offer a more artistic and visual representation of an object, which can be useful for presentations and conceptual design.
Tolerance Stack-Up Analysis: These drawings focus on defining the allowable variations in dimensions and clearances within an assembly to ensure proper functionality.
Surface Finish and Geometric Dimensioning and Tolerancing (GD&T) Drawings: These drawings specify surface finish requirements and geometric tolerances for parts, ensuring their quality and functionality.