



PROJECTION METHOD

PROJECTION METHOD

Perspective

Parallel

Oblique

Orthographic

Axonometric

Multiview

PROJECTION THEORY

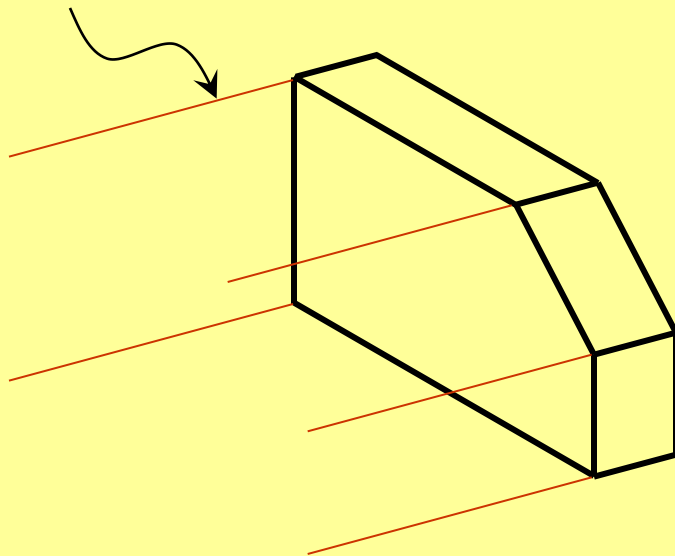
- The projection theory is used to graphically represent 3-D objects on 2-D media (paper, computer screen).
- The projection theory is based on two variables:
 - 1) **Line of sight**
 - 2) **Plane of projection** (image plane or picture plane)

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

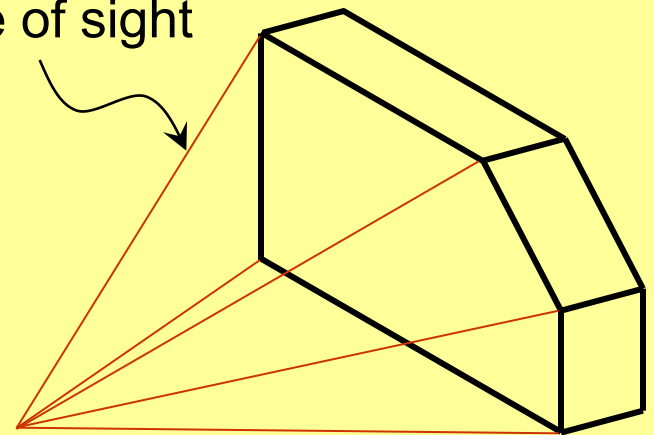
Parallel projection

Line of sight



Perspective projection

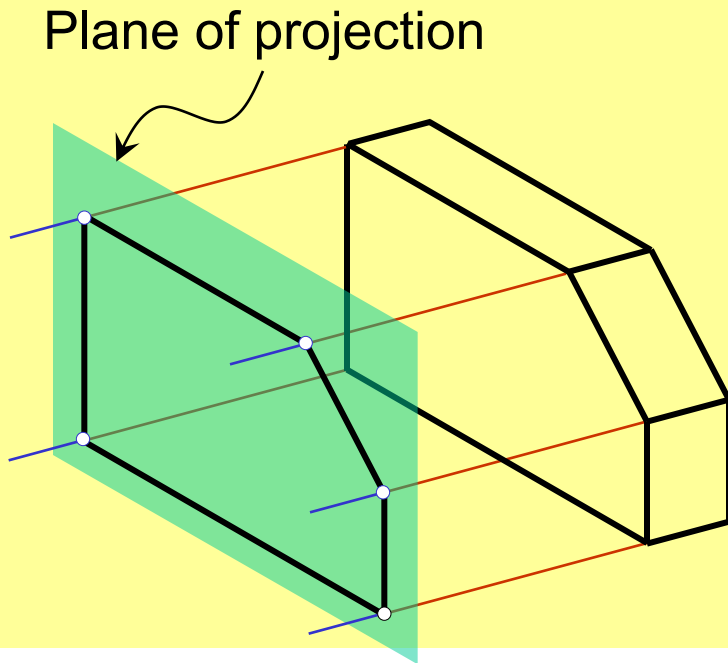
Line of sight



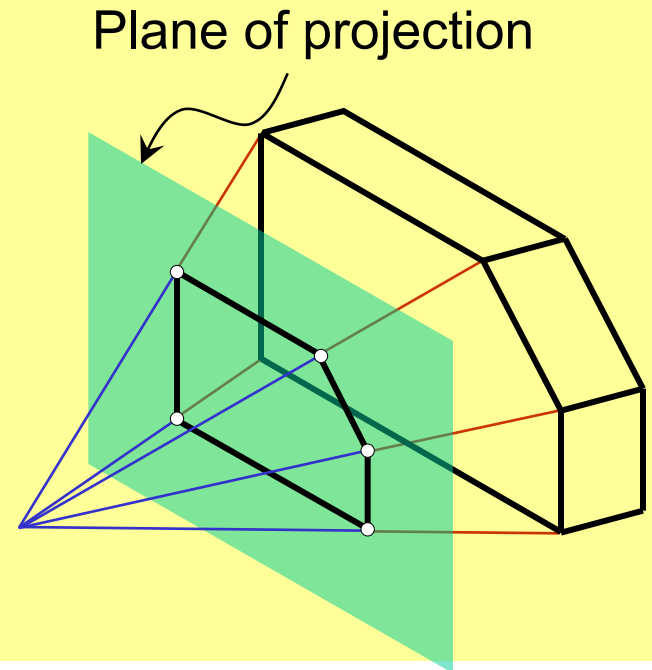
Plane of projection is an imaginary flat plane which the image is created.

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

Parallel projection

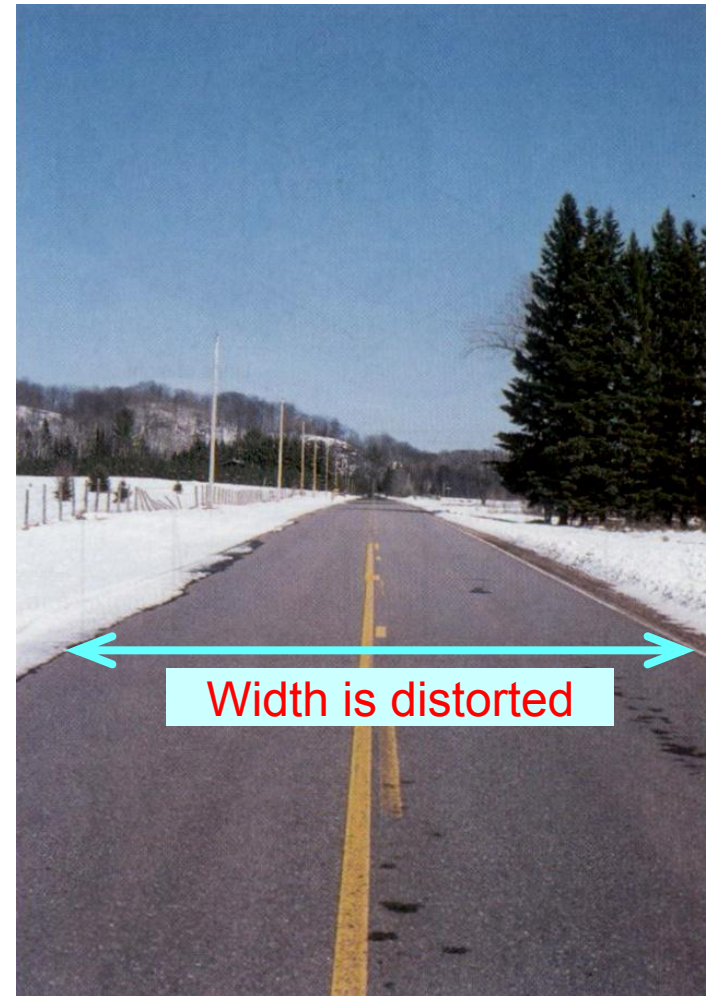


Perspective projection



Disadvantage of Perspective Projection

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

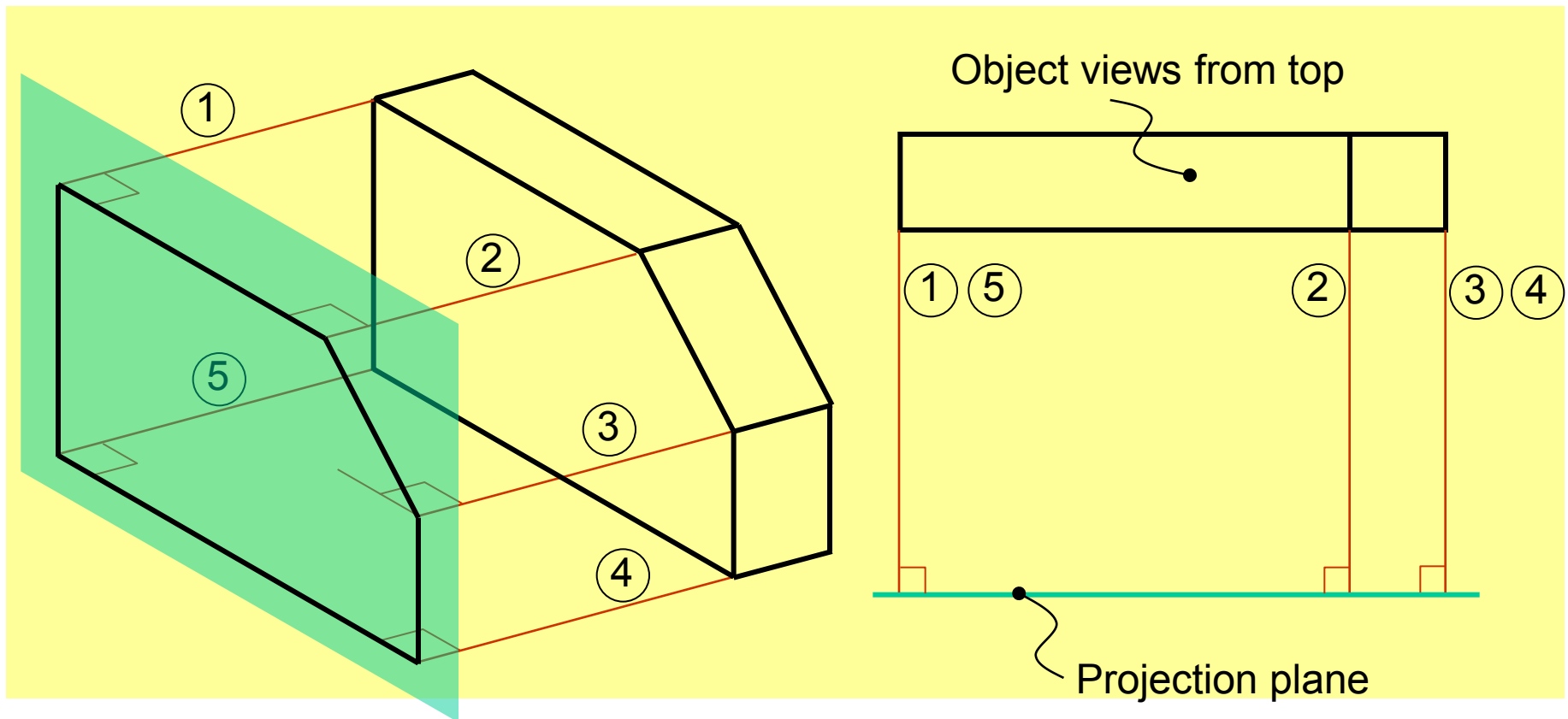




Orthographic Projection

MEANING

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

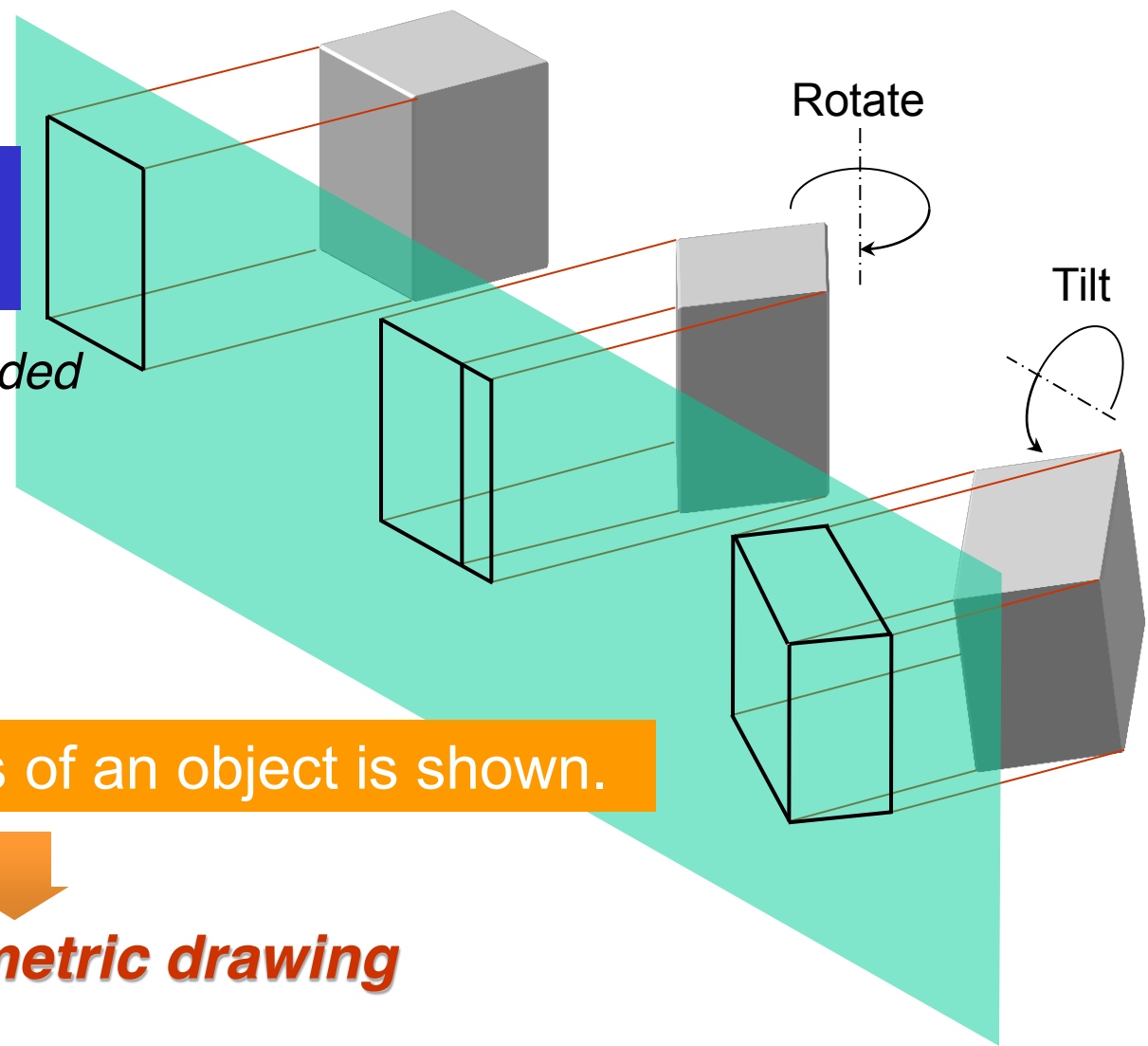


Multiview drawing

Three dimensions of an object is shown.



Axonometric drawing



ORTHOGRAPHIC VIEW

NOTES

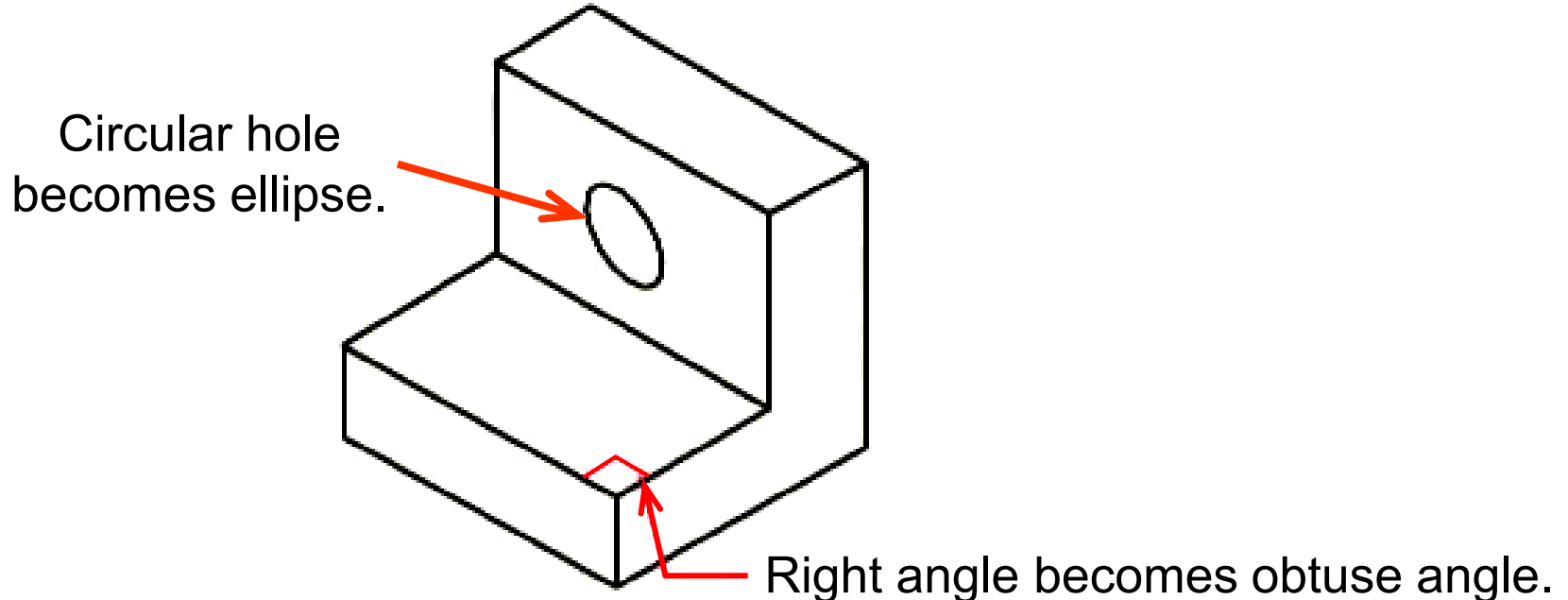
- Orthographic projection technique can produce either
 1. ***Multiview drawing***
that each view show an object in two dimensions.
 2. ***Axonometric drawing***
that show all three dimensions of an object in one view.
- Both drawing types are used in technical drawing for communication.

Axonometric (Isometric) Drawing

Advantage Easy to understand

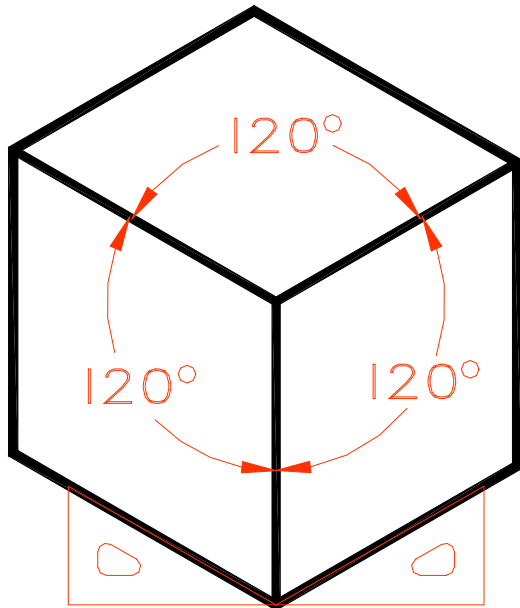
Disadvantage Shape and angle distortion

Example Distortions of shape and size in isometric drawing



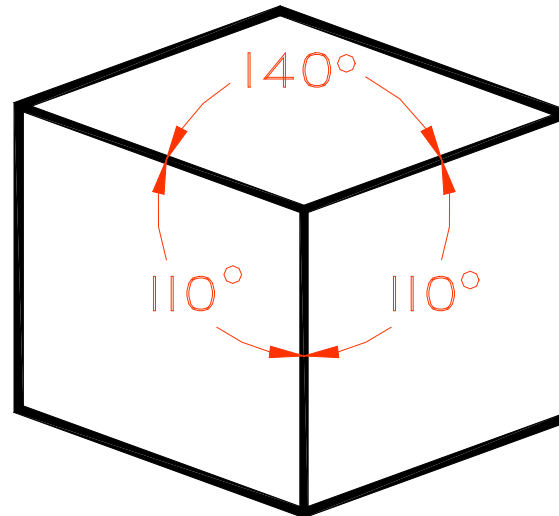
Types of Axonometrics

3 Equal axes
3 Equal angles



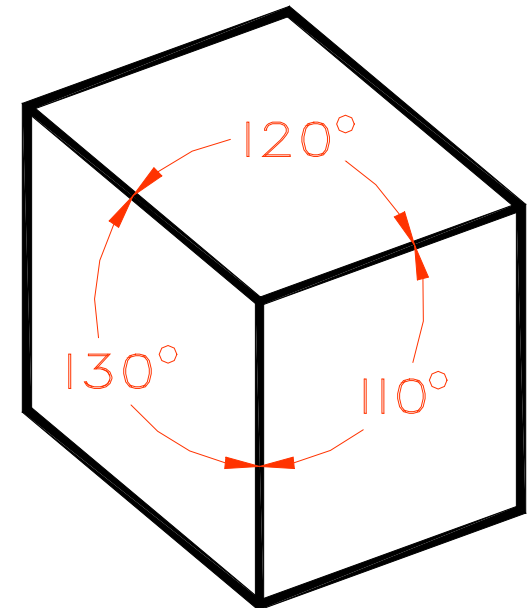
A. ISOMETRIC

2 Equal axes
2 Equal angles



B. DIMETRIC

0 Equal axes
0 Equal angles



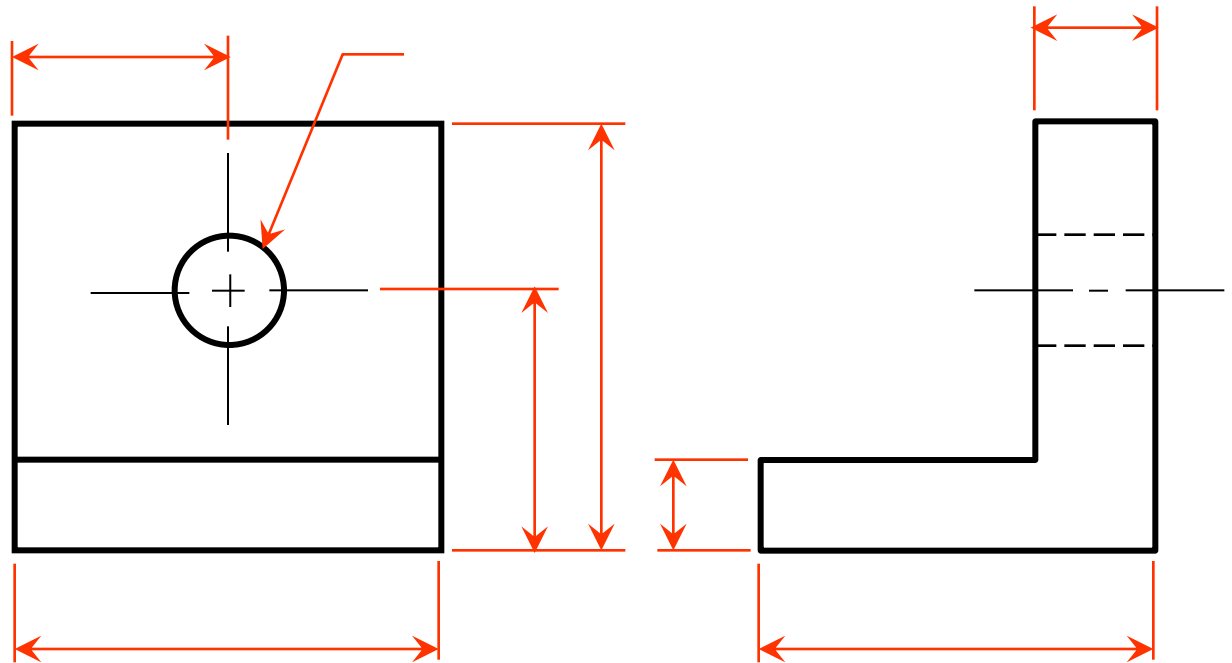
C. TRIMETRIC

Multiview Drawing

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

Disadvantage Require practice in writing and reading.

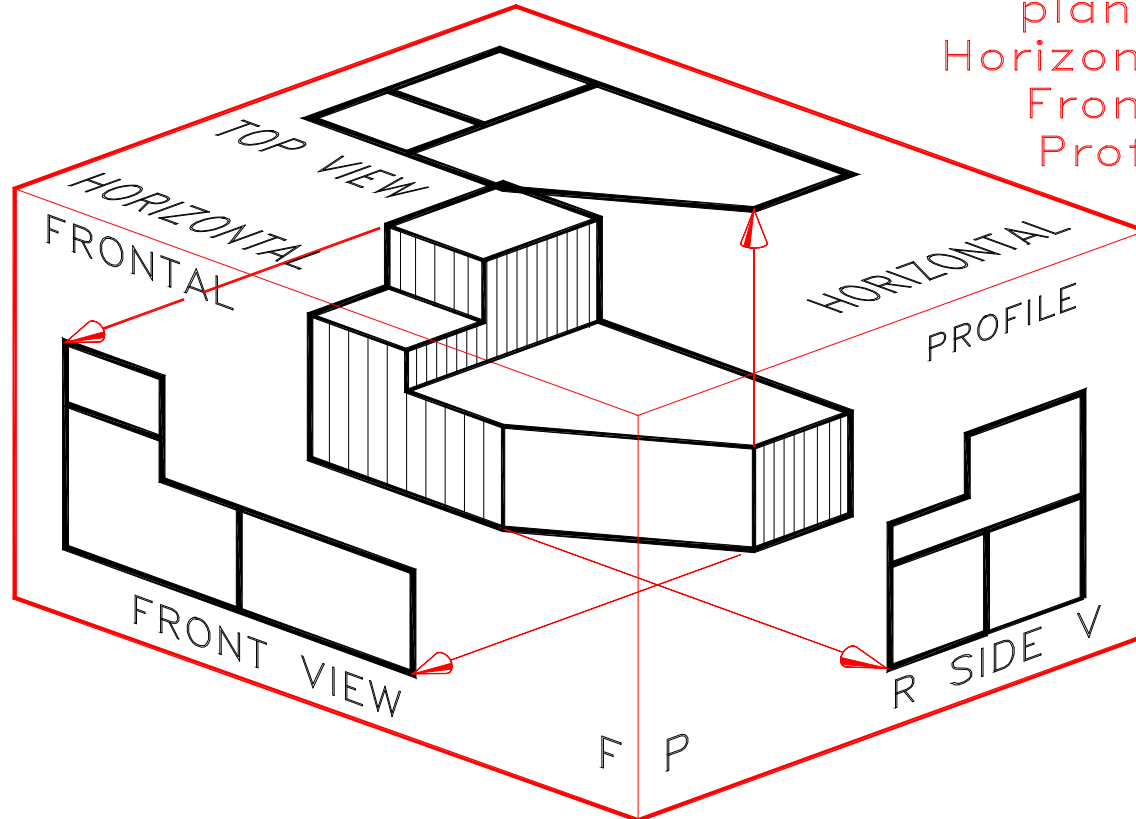
Example Multiviews drawing (2-view drawing)



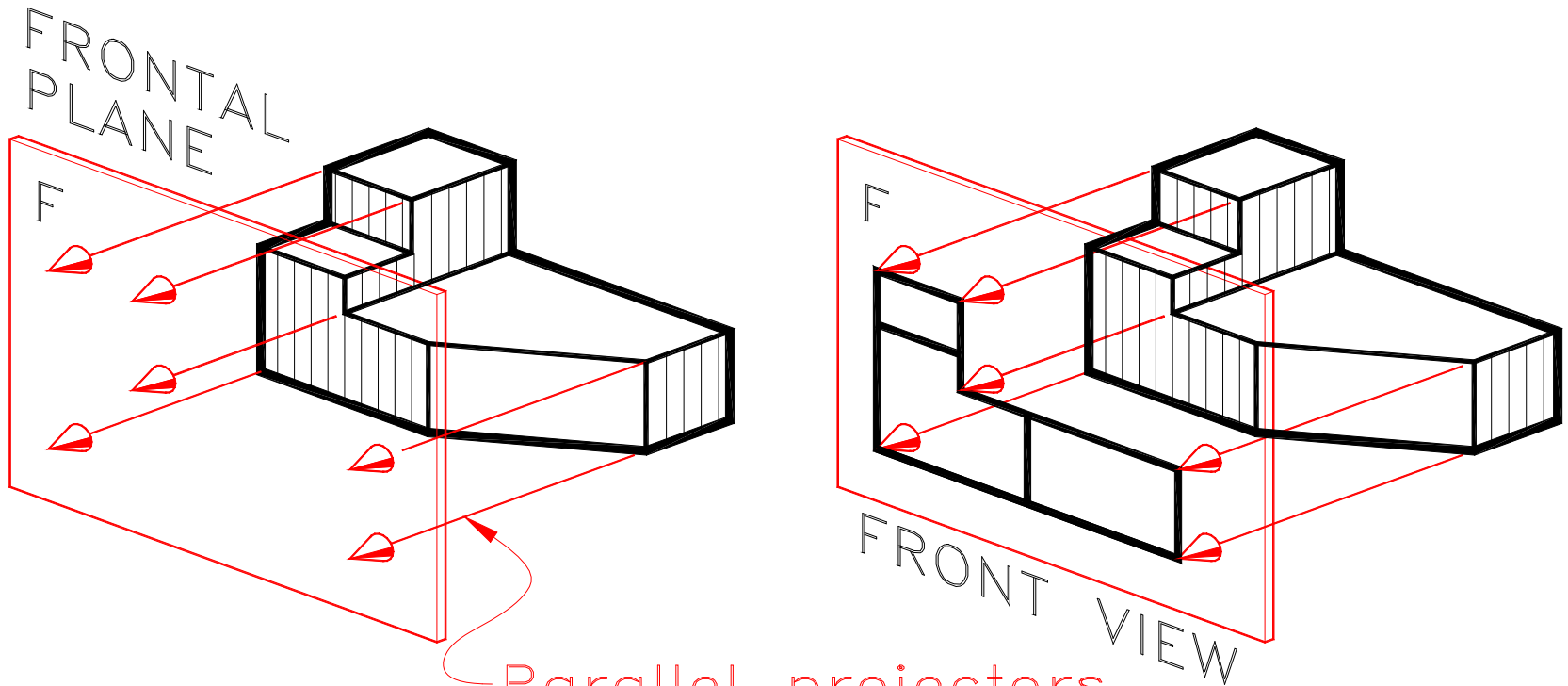
The Glass Box Approach

THE GLASS-BOX APPROACH

Principal projection planes:
Horizontal
Frontal
Profile

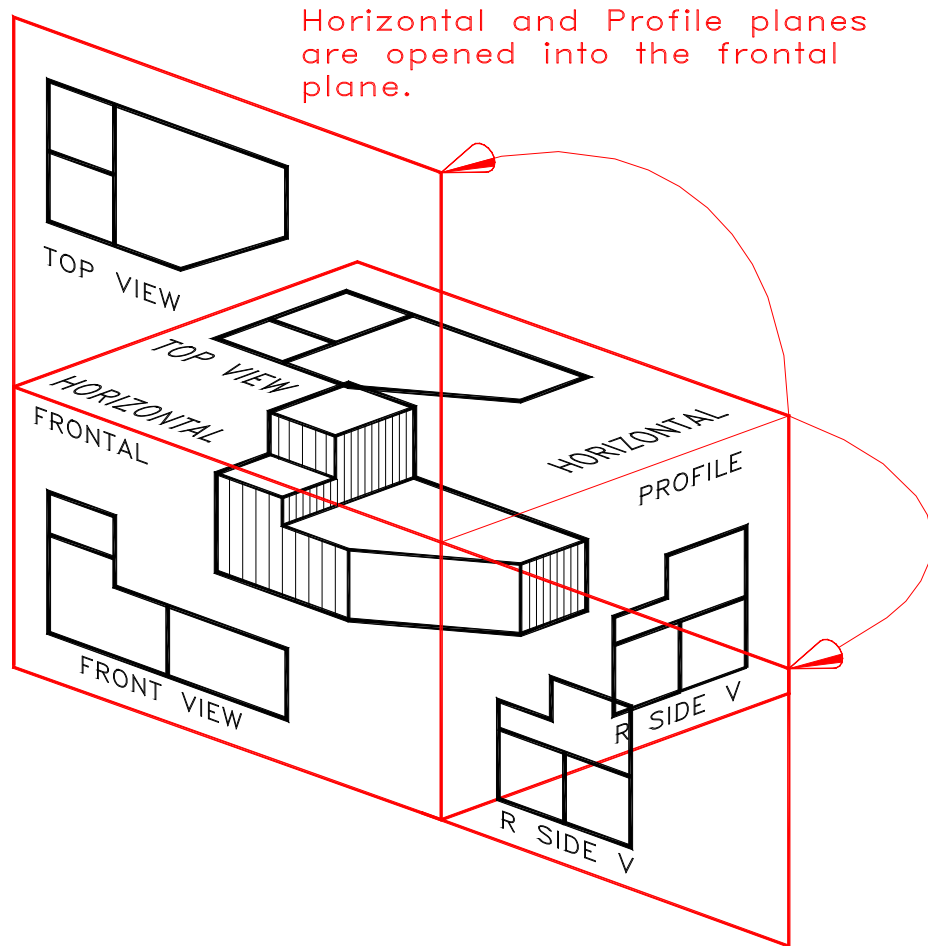


Orthographic Projection



Parallel projectors
perpendicular to
frontal plane

Opening the Box

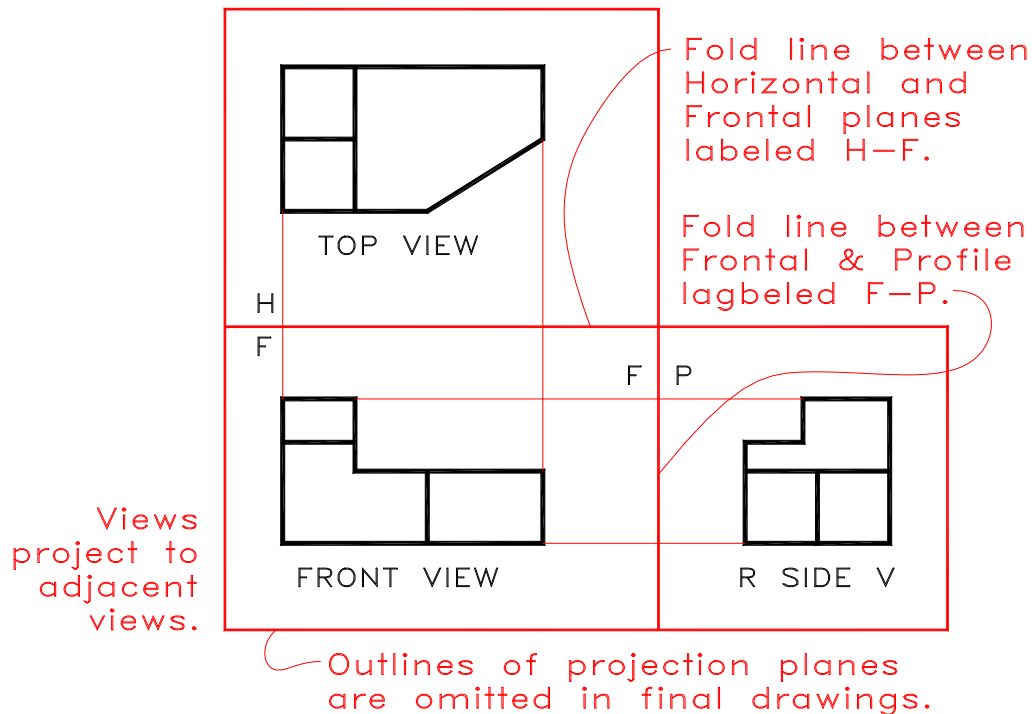


Final Views

The standard arrangement of three orthographic views:

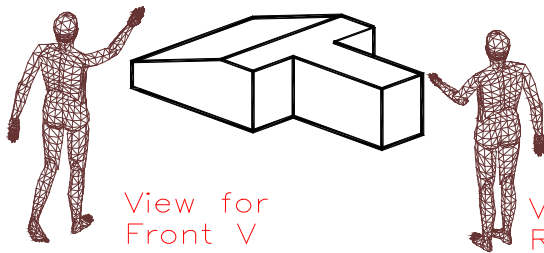
Top View above the Front View

R Side View right of the Front View

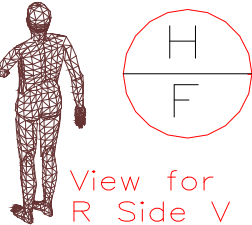


Six Orthographic Views

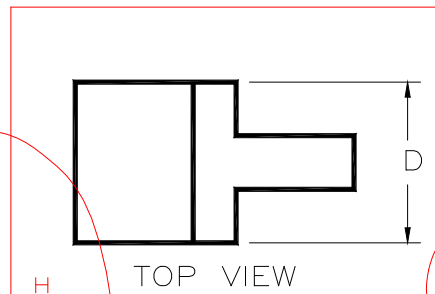
Laying Out All Six Views



View for Front V

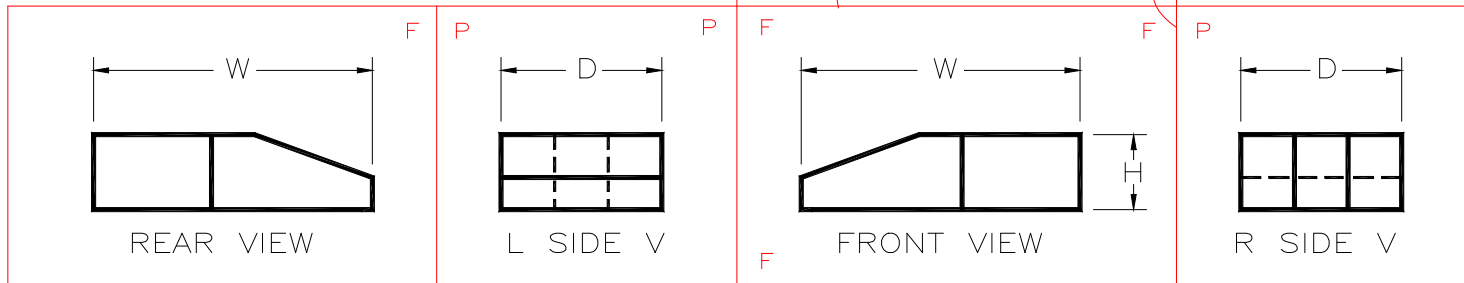


View for R Side V



TOP VIEW

Fold line between Frontal & Profile

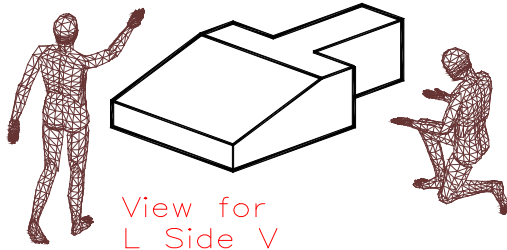


REAR VIEW

L SIDE V

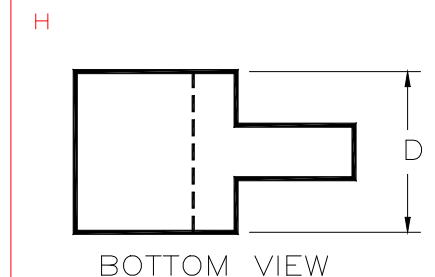
FRONT VIEW

R SIDE V



View for L Side V

View for Front V

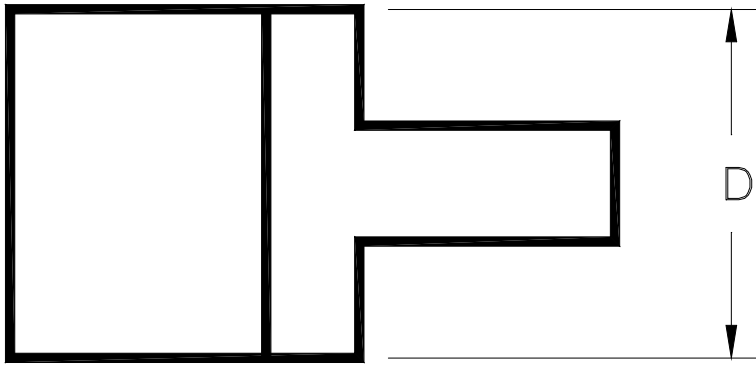


BOTTOM VIEW

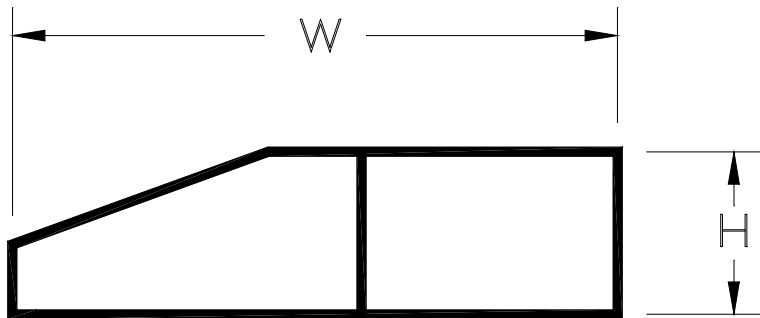
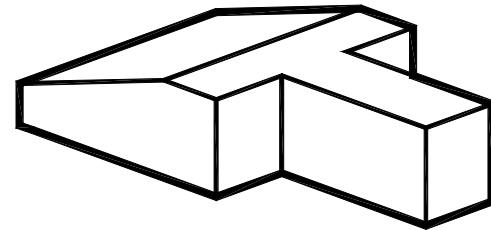
The glass box is opened into a single plane to show the six principal views.

The outlines of glass box are omitted in an orthographic drawing.

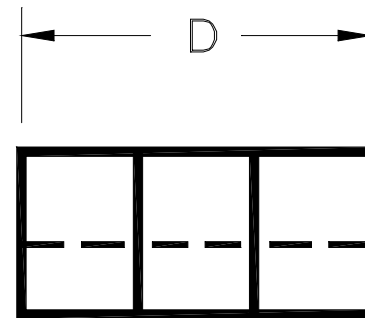
Three Primary Views



TOP VIEW

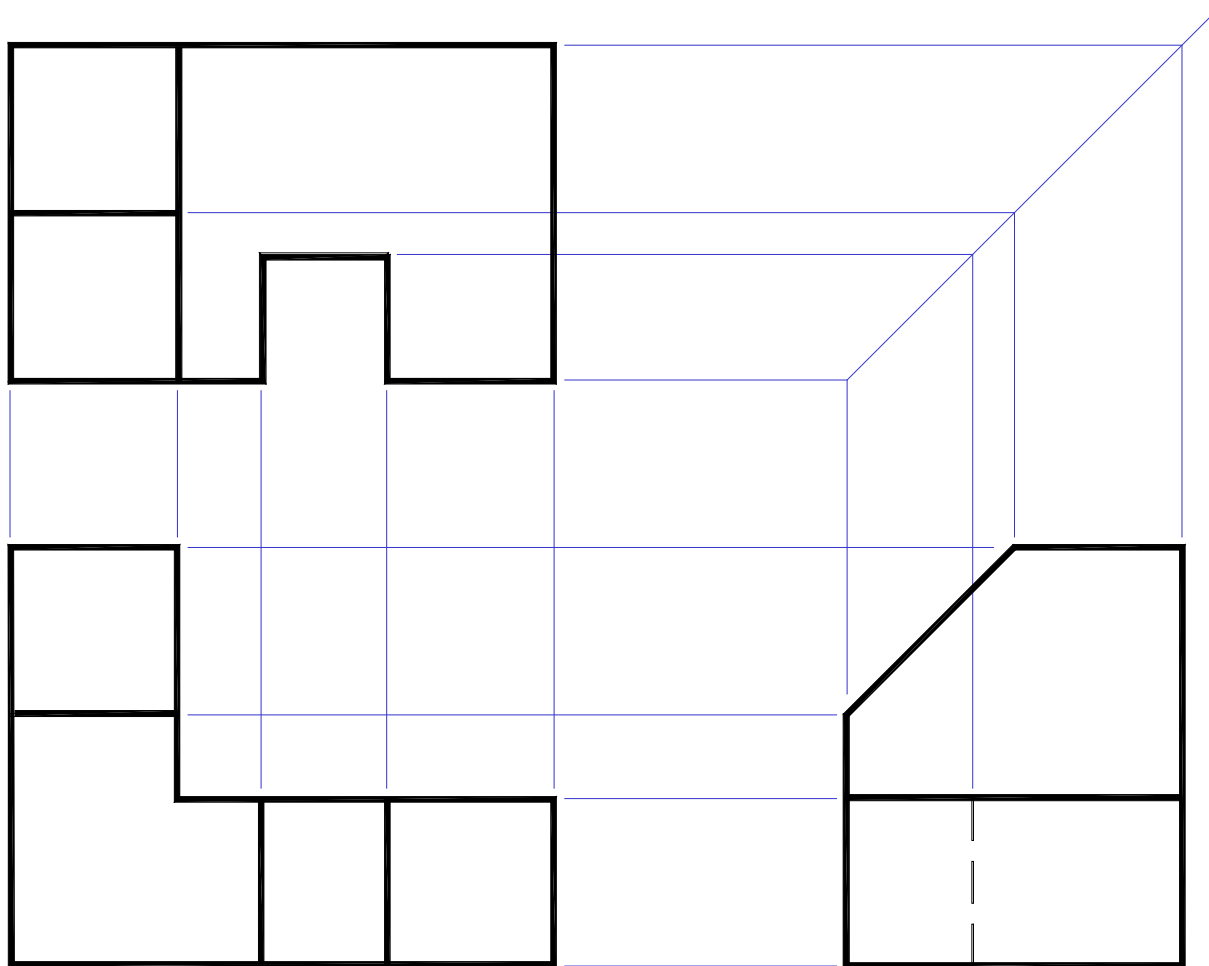


FRONT VIEW

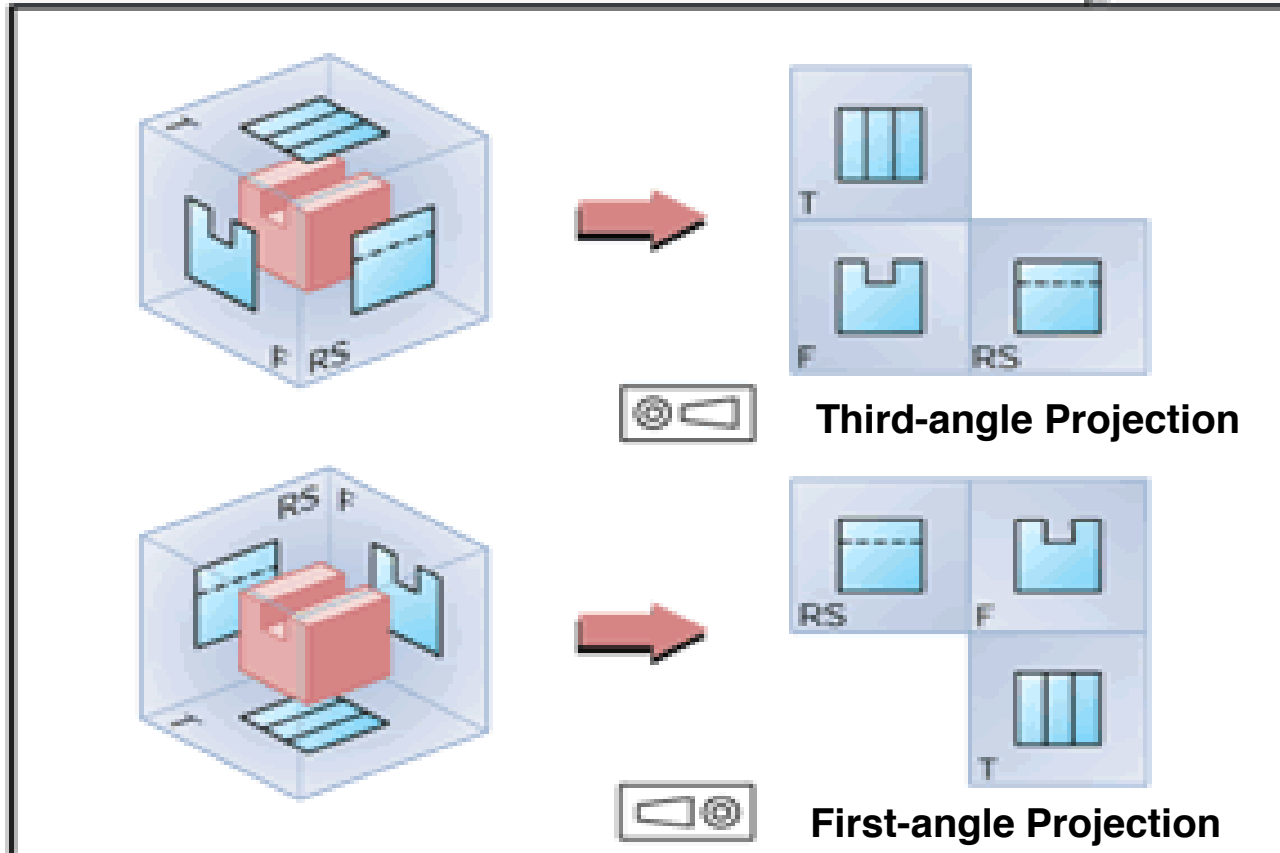


R SIDE V

Construction of Views



First and Third Angle Projections



- First Angle – International
- Third Angle – U.S.