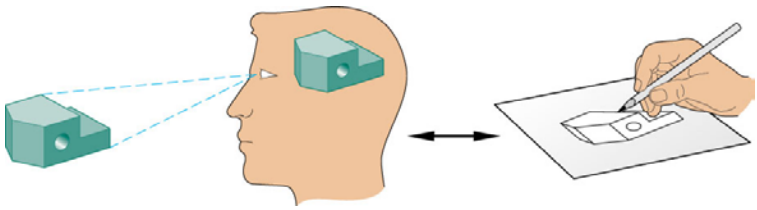
Session 3 : Orthographic Projection



- Represent an object with drawings
- Real world is 3D whereas paper is 2D
- 3D → projection→ 2D

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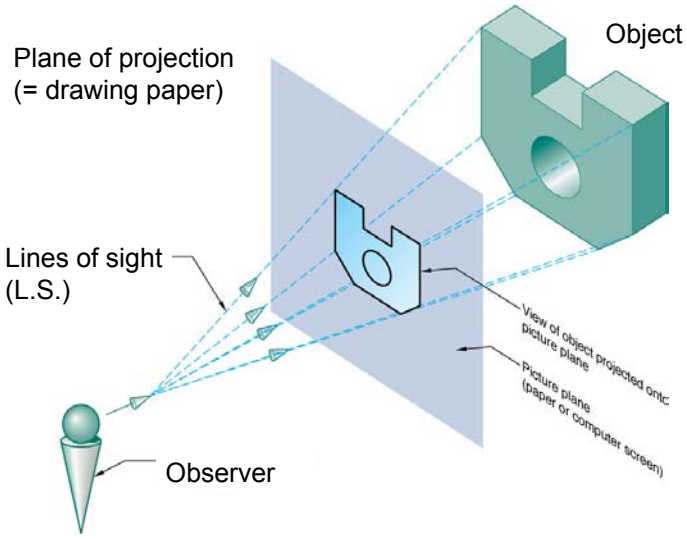
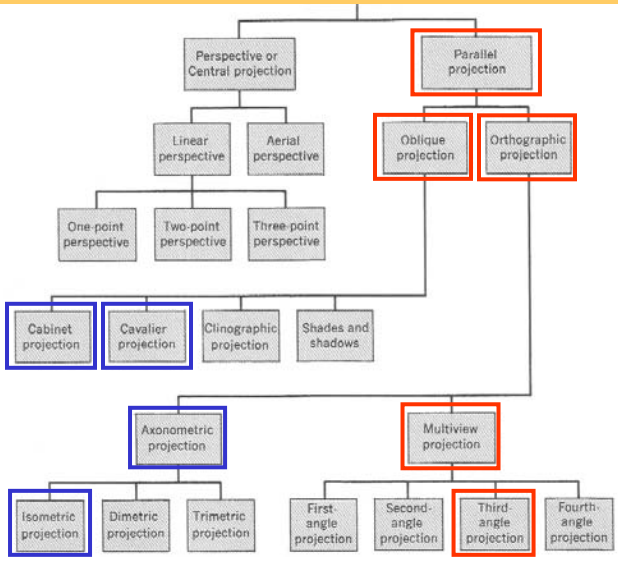
Projection



Types of projection



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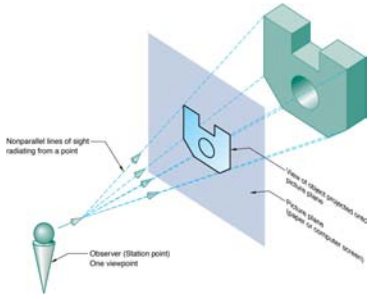
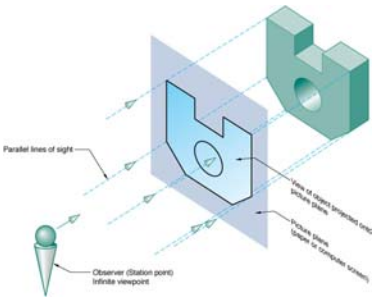
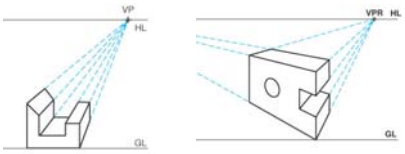
Perspective vs. Parallel projections

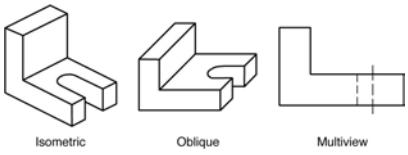


Perspective

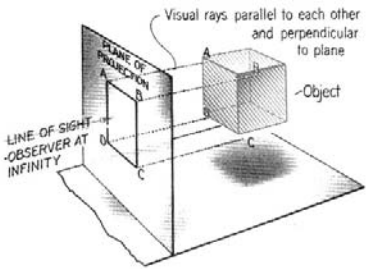


Parallel



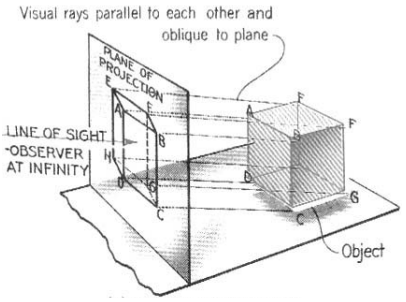


Parallel projection



Orthographic

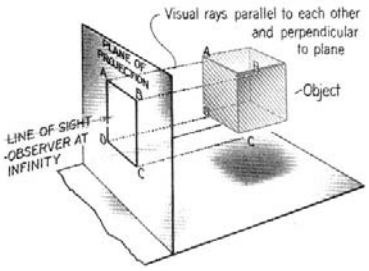
L.S. perpendicular to plane



Oblique

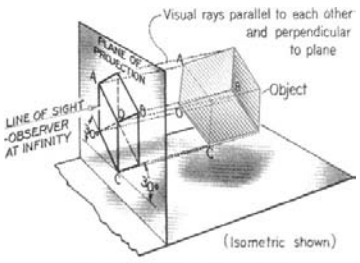
L.S. oblique to plane

Orthographic projection



Multiview

Face align with plane



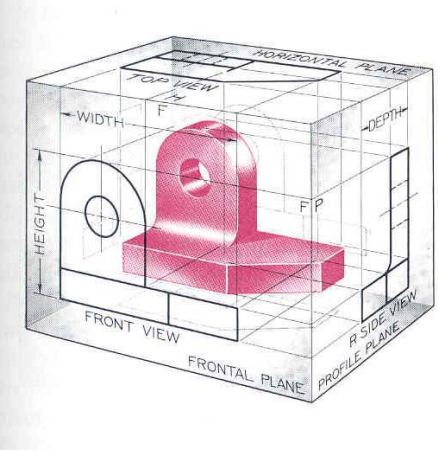
Axonometric

Edge align with plane:

Isometric, Dimetric, Trimetric.

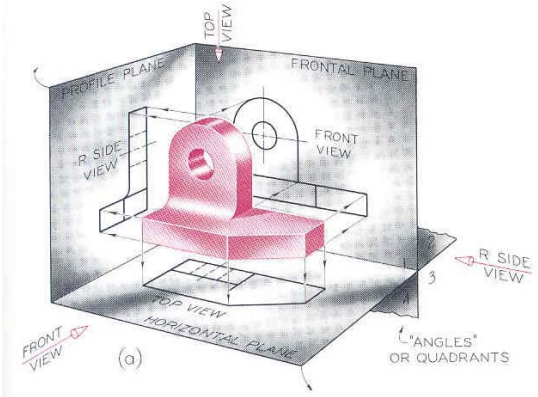
3rd Angle projection

- **Third-angle projection**
  - Object is assumed to be behind the image plane
  - Line of sight: image plane → object
  - View is formed by projecting back to the image plane
  - used in U.S.A., Ca, UK, TH, etc.

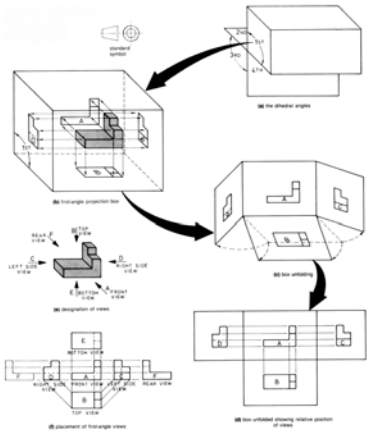


1st Angle projection

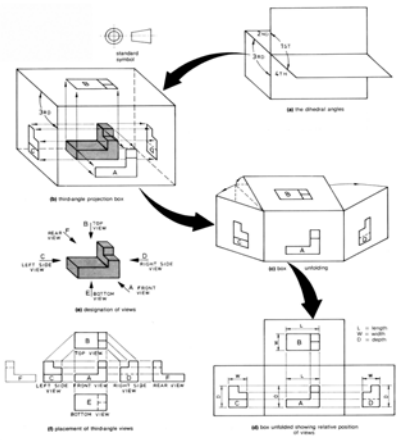
- **First-angle projection**
  - Object is assumed to be in front of the image plane
  - Line of sight: object → image plane
  - View is formed by projecting through object and onto the image plane
  - used in other countries



1st and 3rd Angle projections

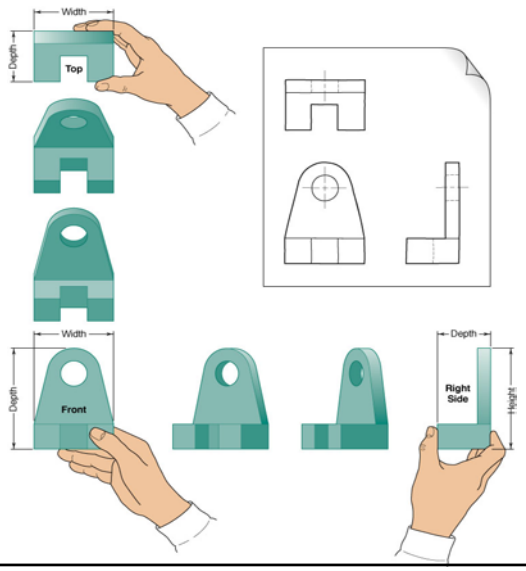


1st angle

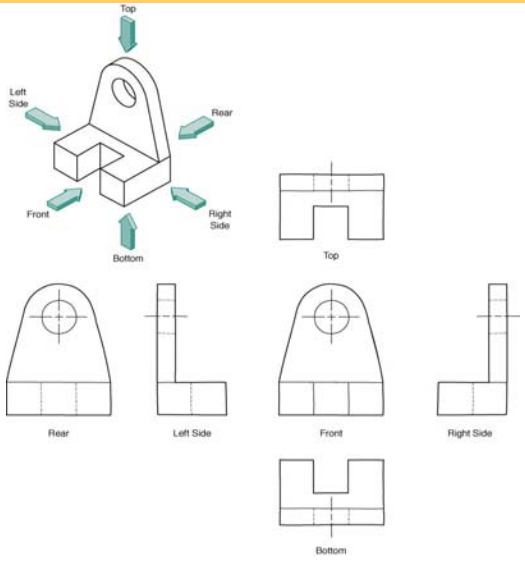


3rd angle

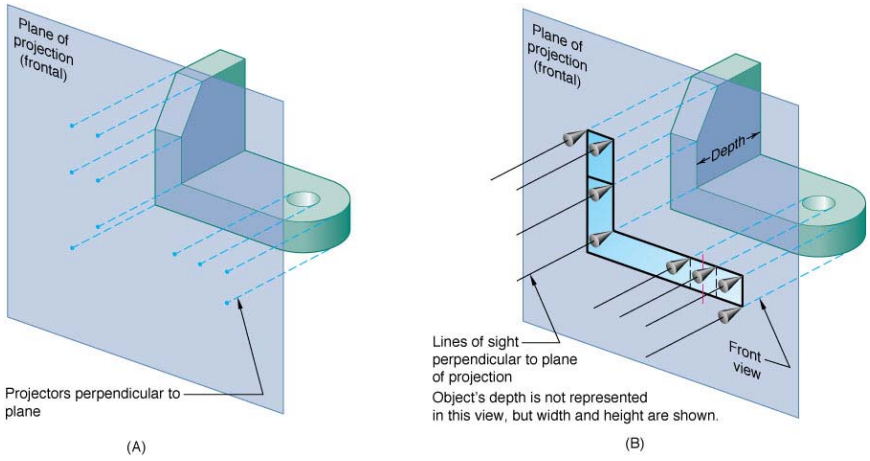
Views of objects



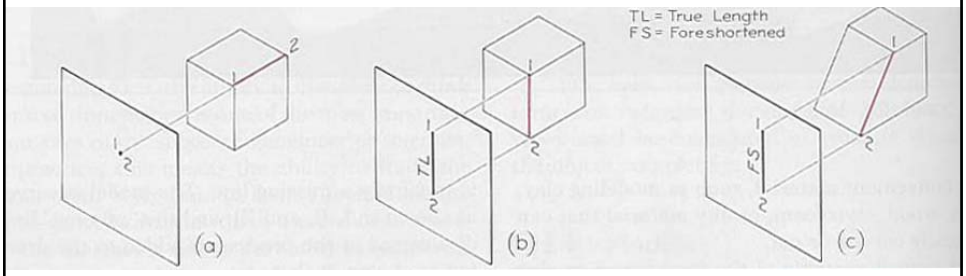
Six views of an object



Plane of projection & Lines of sight



Projection of lines

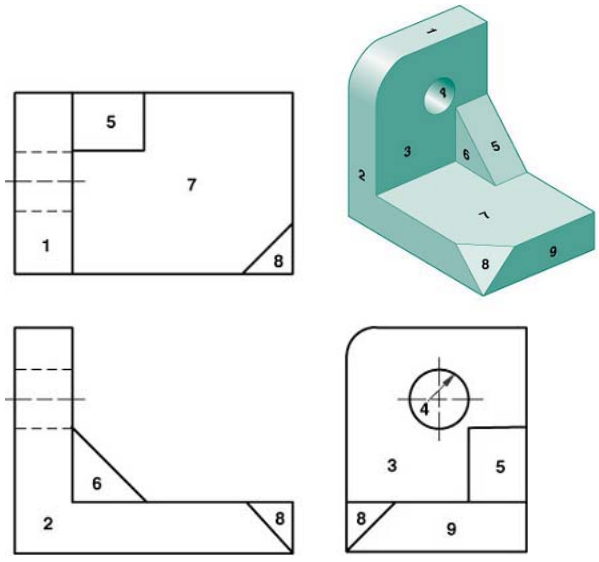


Projection of line shows a point on plane

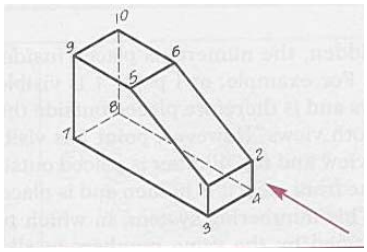
Projection of line shows a true length on plane

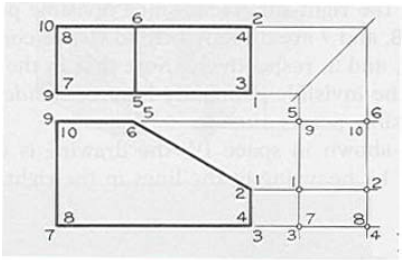
Projection of line shows a foreshortened on plane

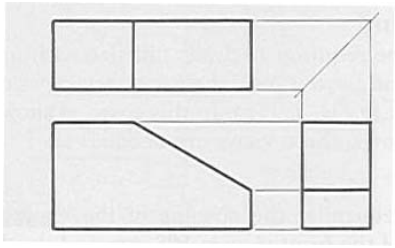
Projection of planes



Projecting onto views

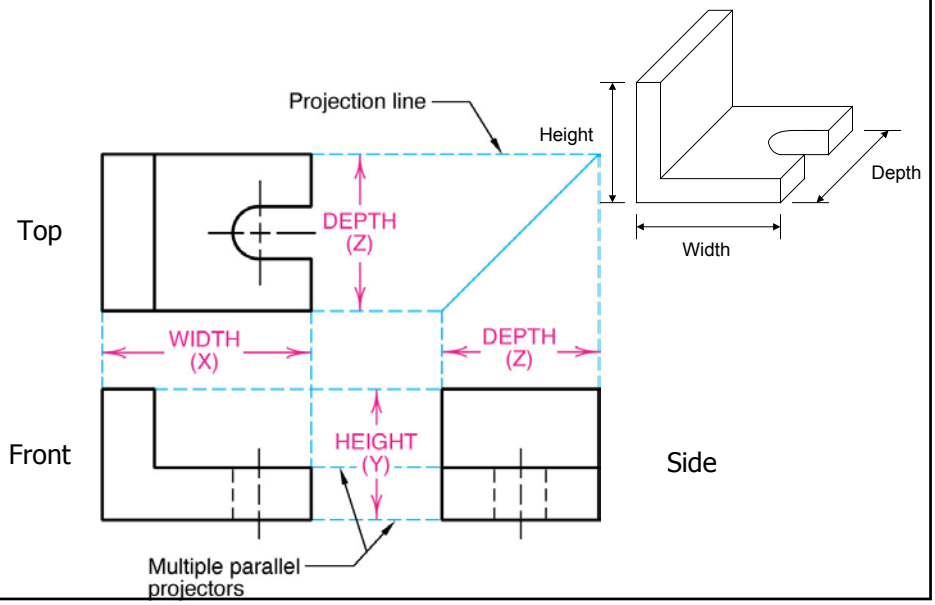




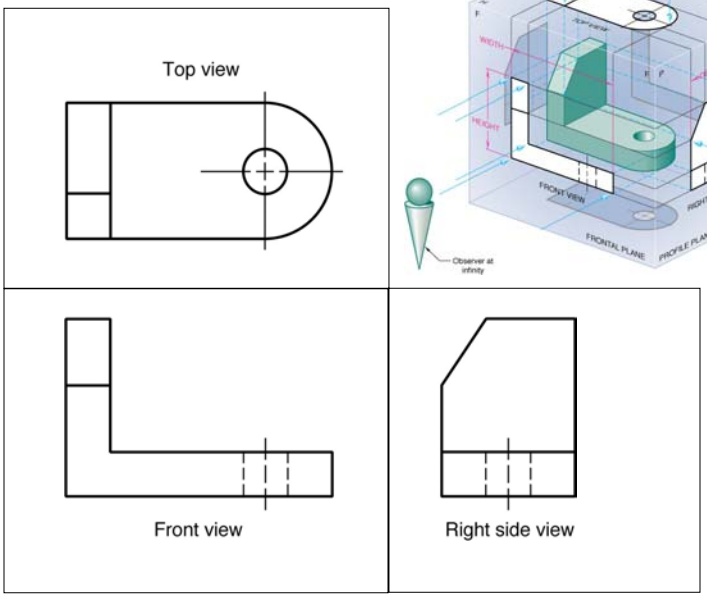


Note: Numbers of visible points in a given view are placed outside the corners.

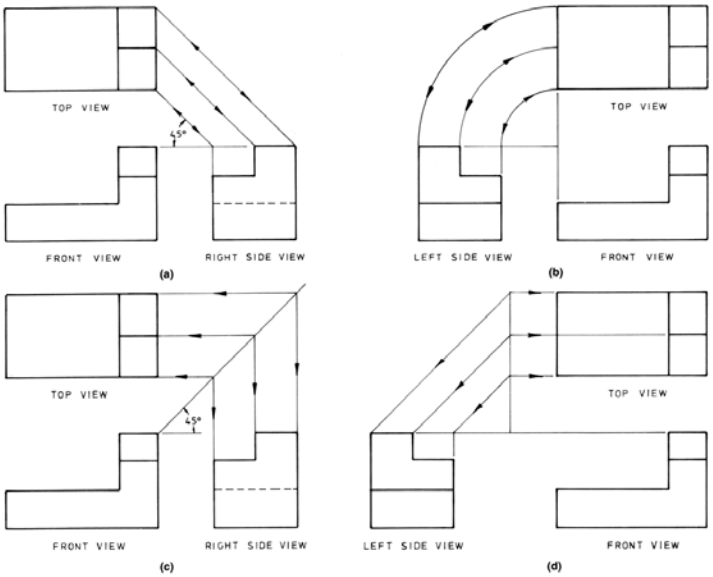
Relationship of orthogonal views



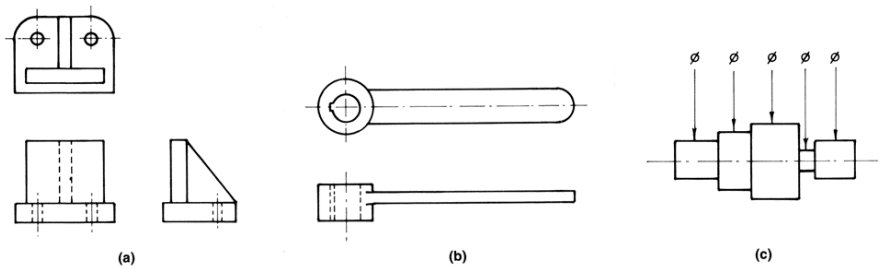
3rd angle projection



Methods of projection between views



Choosing numbers of views

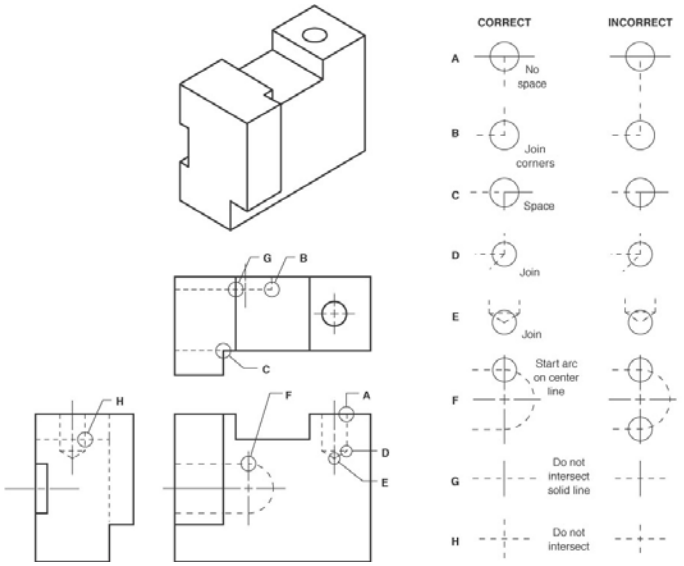


3 Views:
top, front, and side

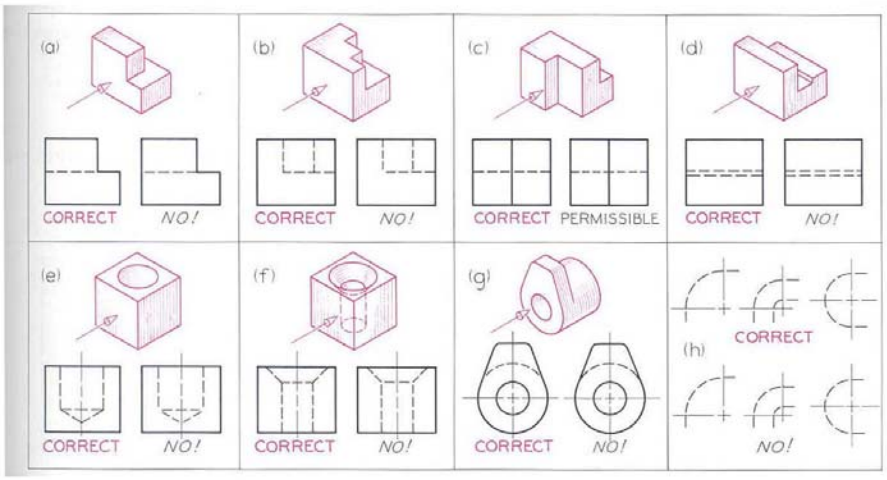
2 Views:
top, and front

1 View:
top (or front) &
diameters

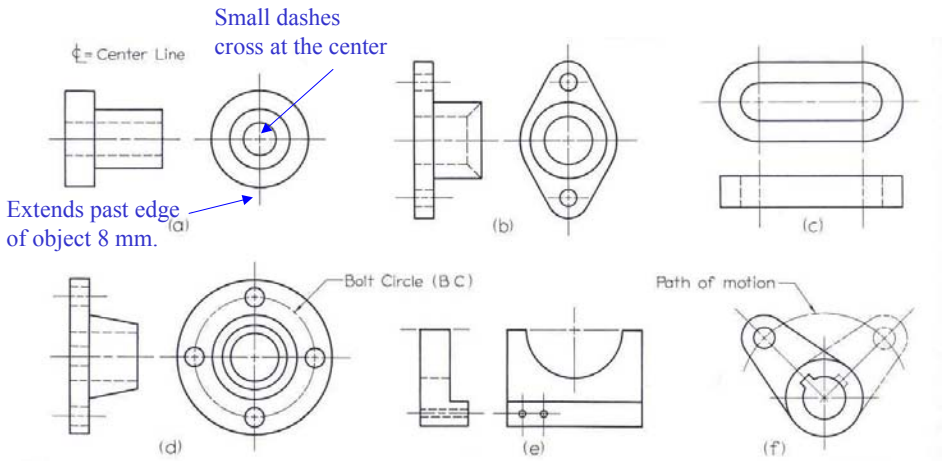
Hidden lines practices (I)



Hidden lines practices (II)



Center-line practices

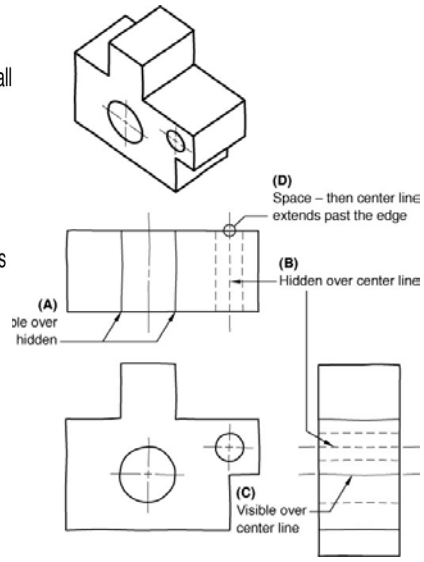


Precedence of lines

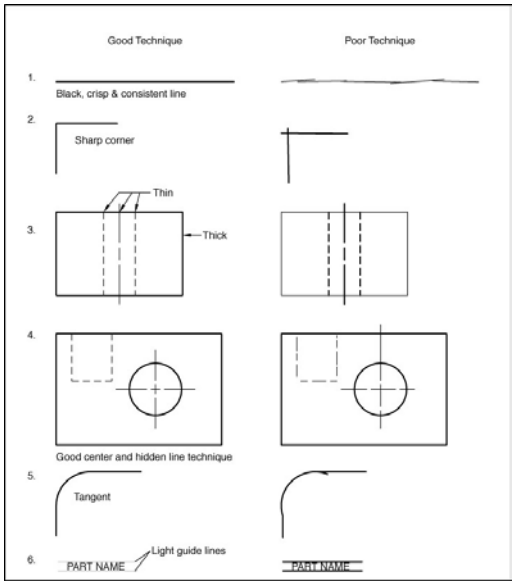
VISIBLE LINE takes precedence over all other lines

HIDDEN LINE and CUTTING PLANE LINE take precedence over center lines

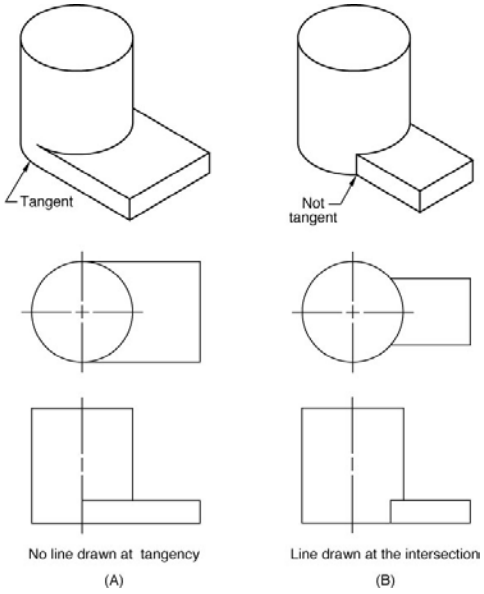
CENTER LINE does not have precedence



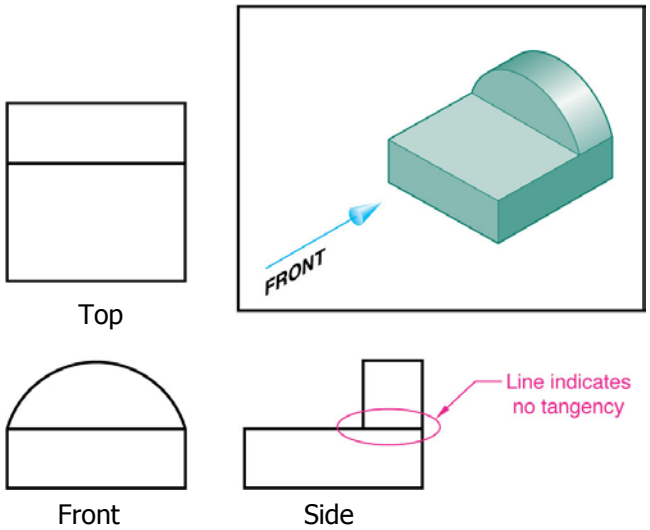
Good & poor techniques



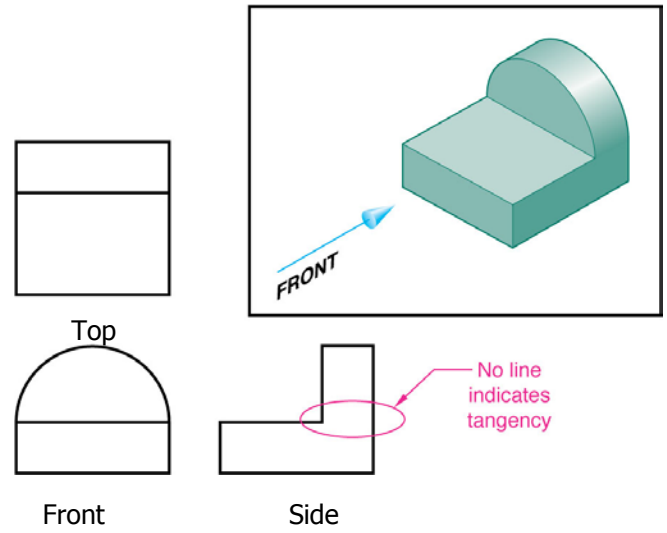
Tangency v.s. Edges



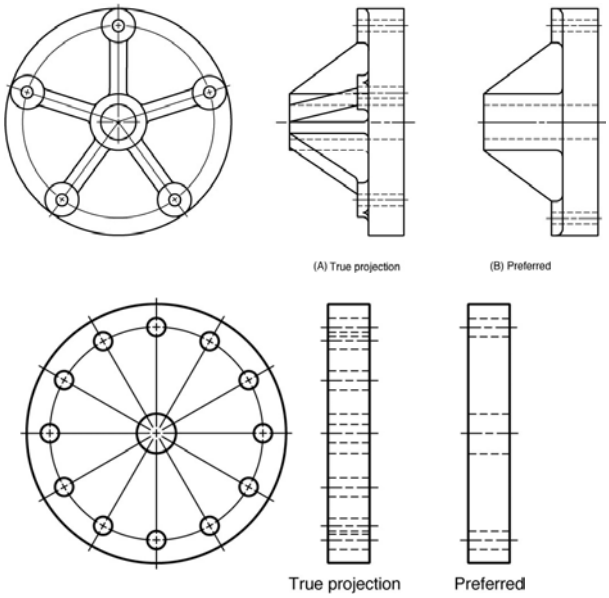
Representation of non-tangency



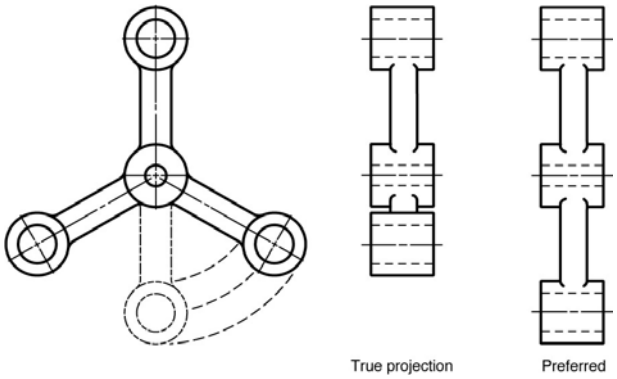
Representation of tangency



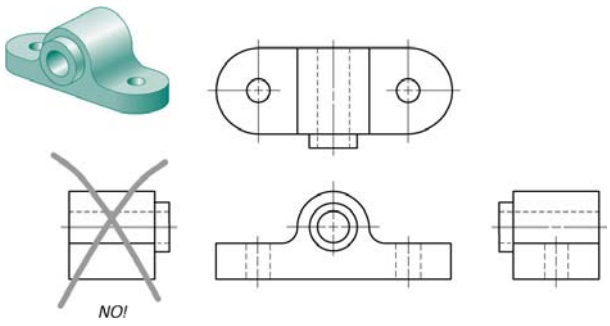
Revolution conventions (I)



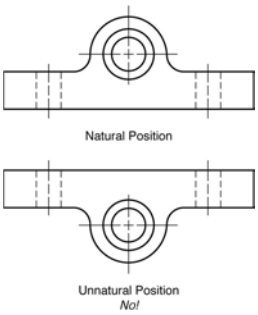
Revolution conventions (II)



Don’t do.

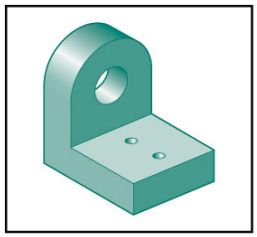


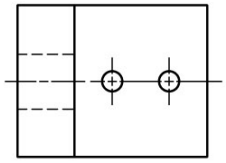
Redundant

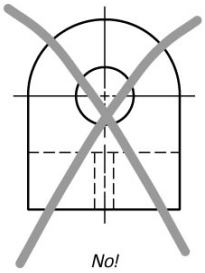


Unnatural

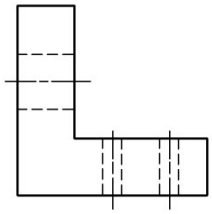
Don't do.

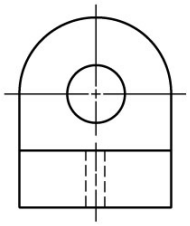
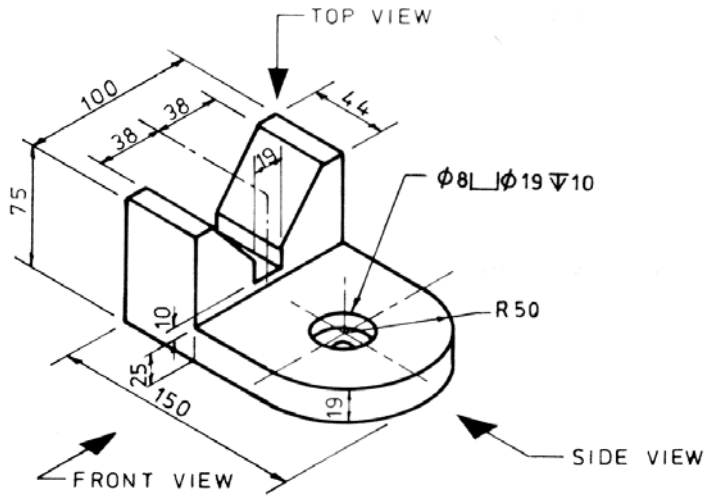






No!





Example