

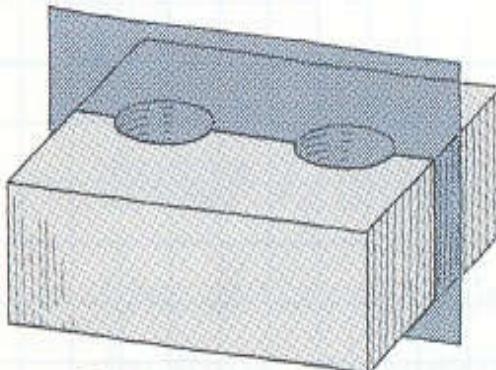
Technical Arts (TA 101AA) Engineering Graphics

Prof. Nachiketa Tiwari
Department of Design

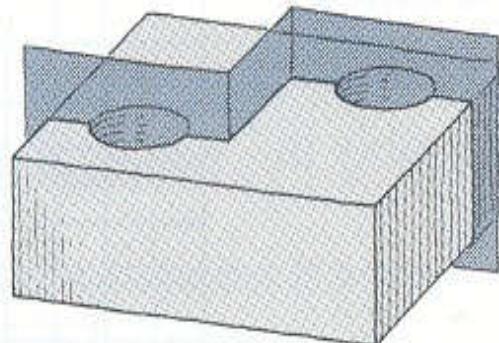
Section Views-III

Sectional Views

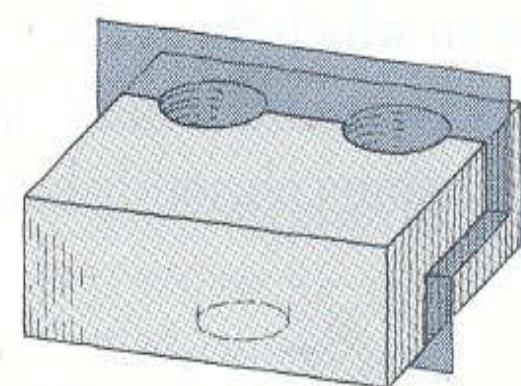
- All regions where material is cut by the imaginary cutting plane in the sectioned view should be hatched.



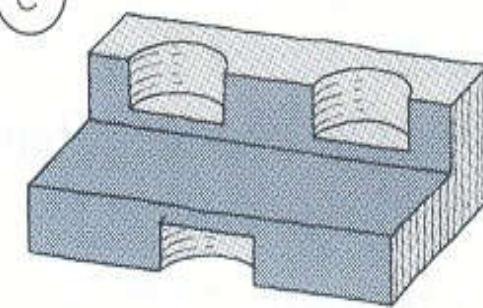
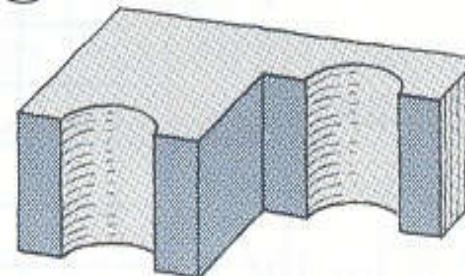
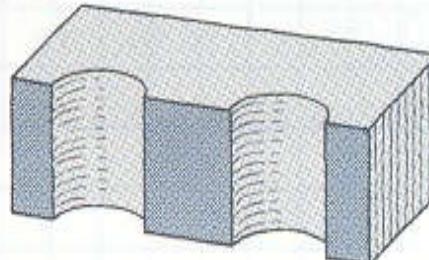
(A)



(B)

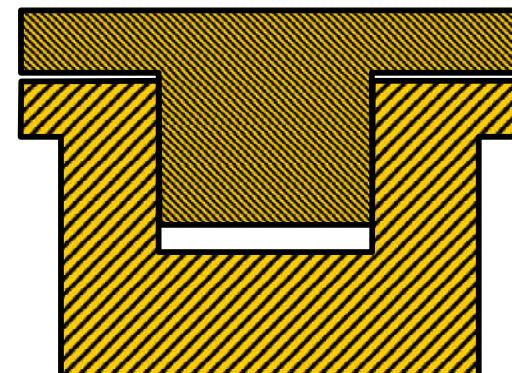


(C)



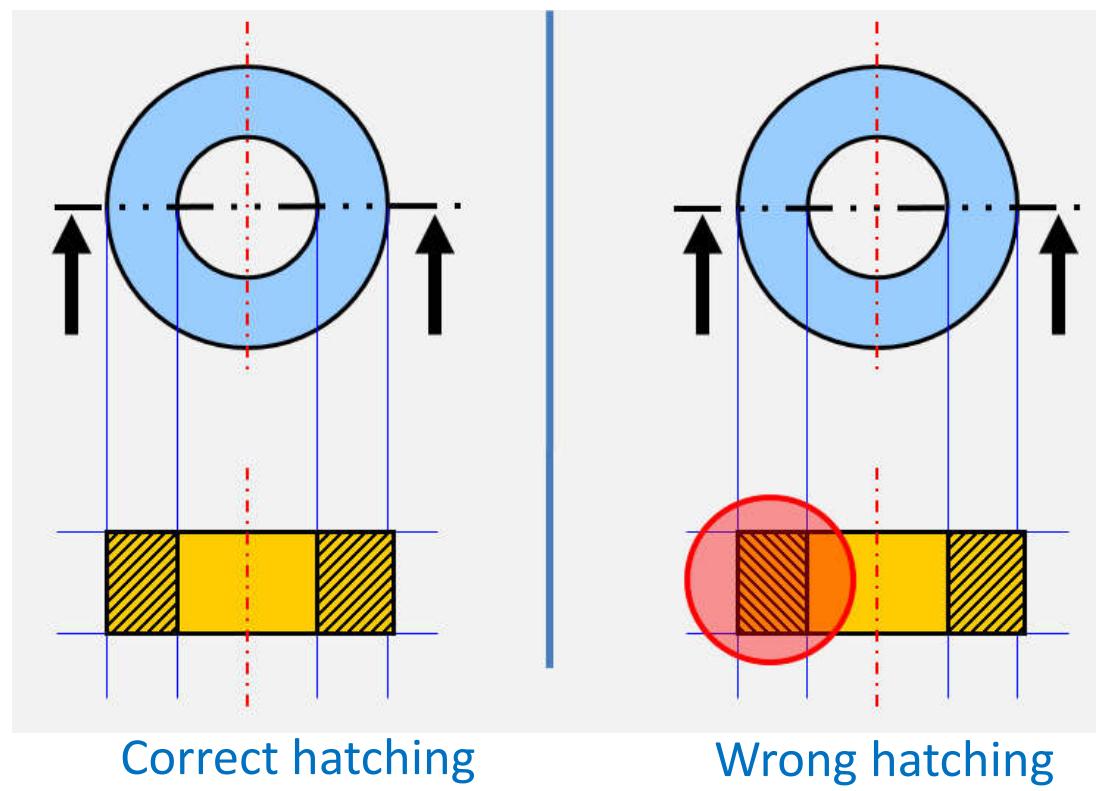
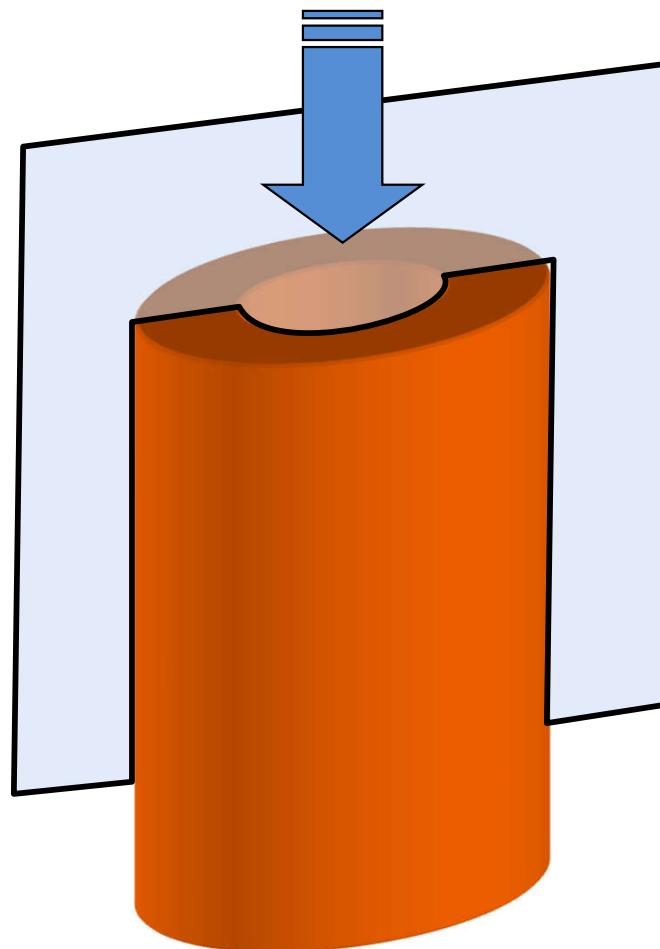
Rules for Hatching

- A series of parallel lines drawn at 30°, 45 °, 60° & 75° and evenly spaced about 3mm apart.
- Do not draw hatching lines parallel to one or more sides of the object. Use another angle.
- Very thin areas can be darkened.
- Hatching lines are thin and light made by 2H pencil.



Hatching

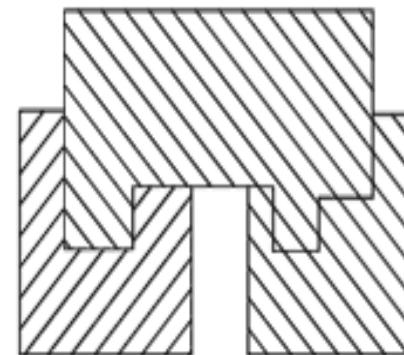
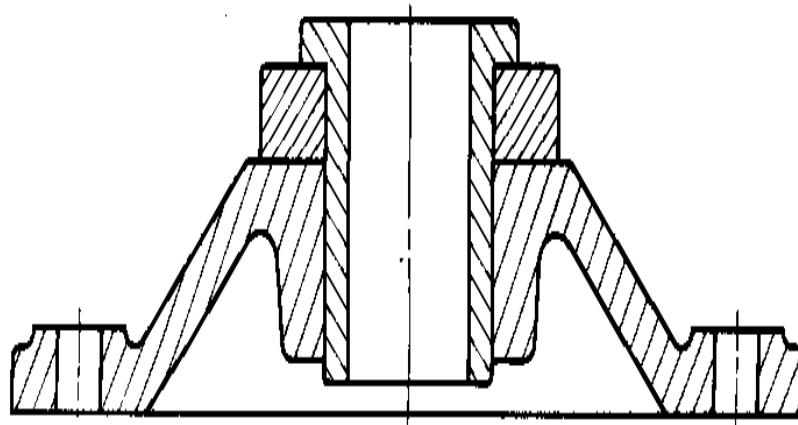
- Same part to have same direction of hatching.
- Different direction of hatching to differentiate between different parts.



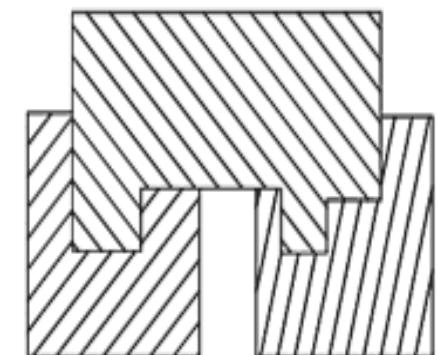
Section AA

Hatching for Different Parts

- Different parts are hatched at different angles to differentiate-even if made of same material

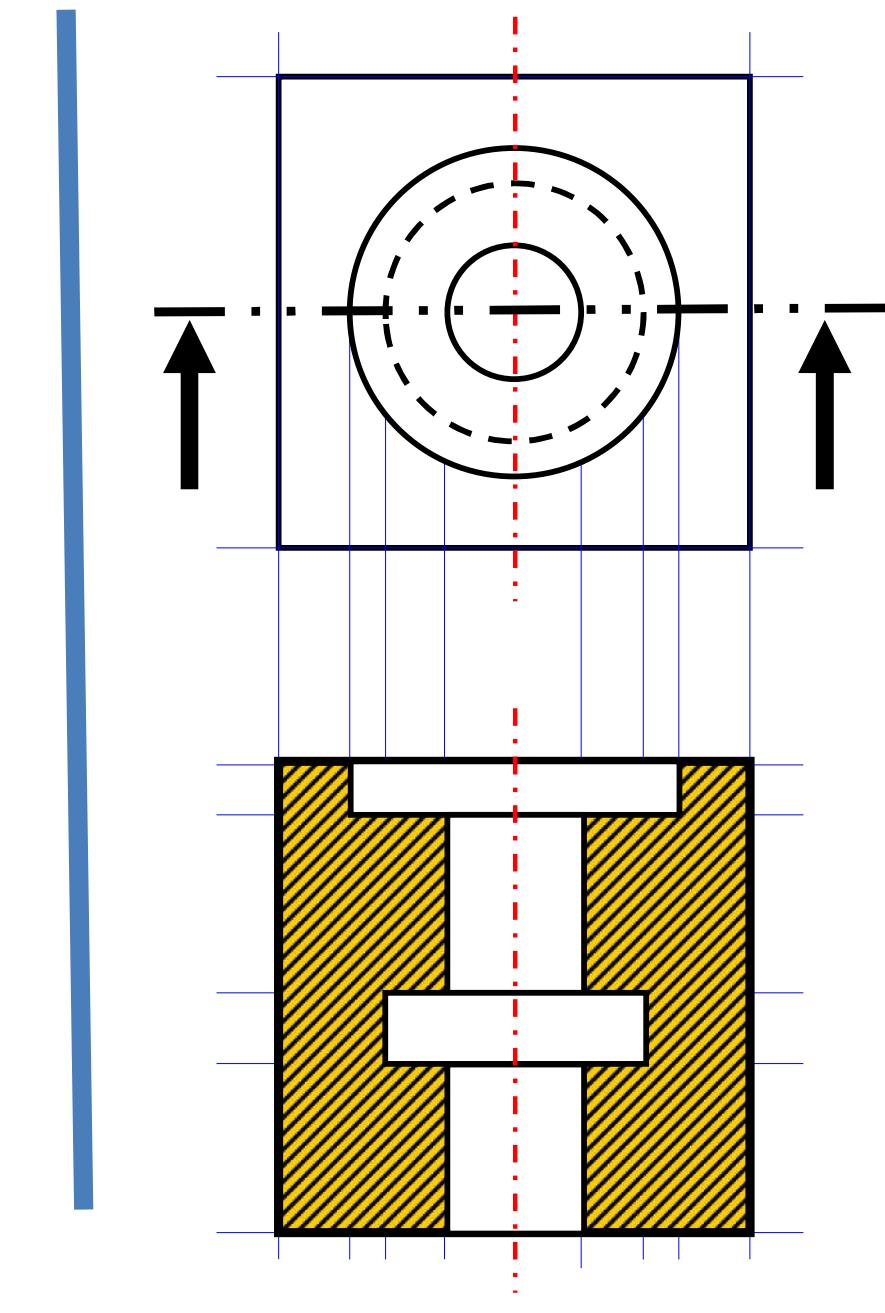
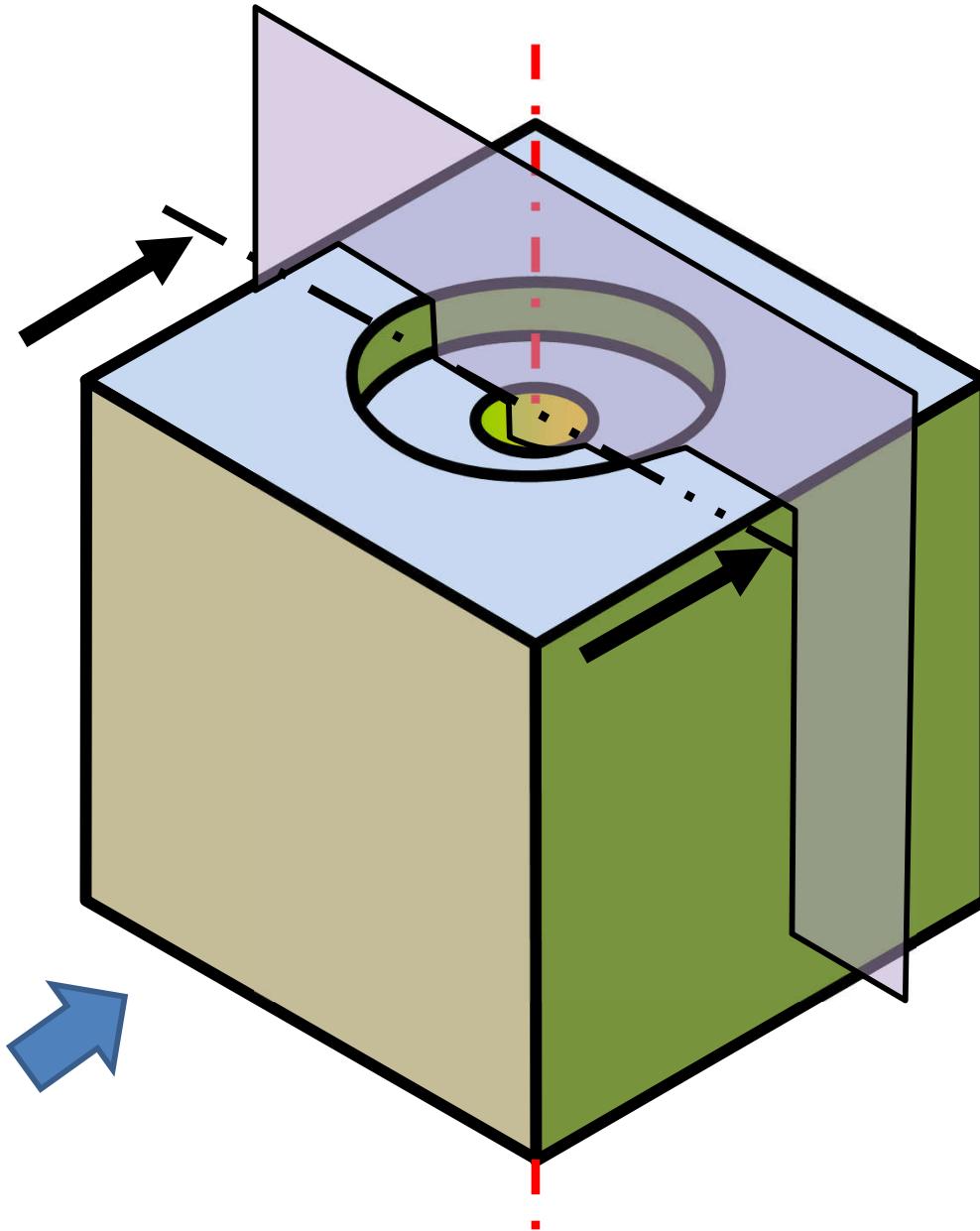


WRONG



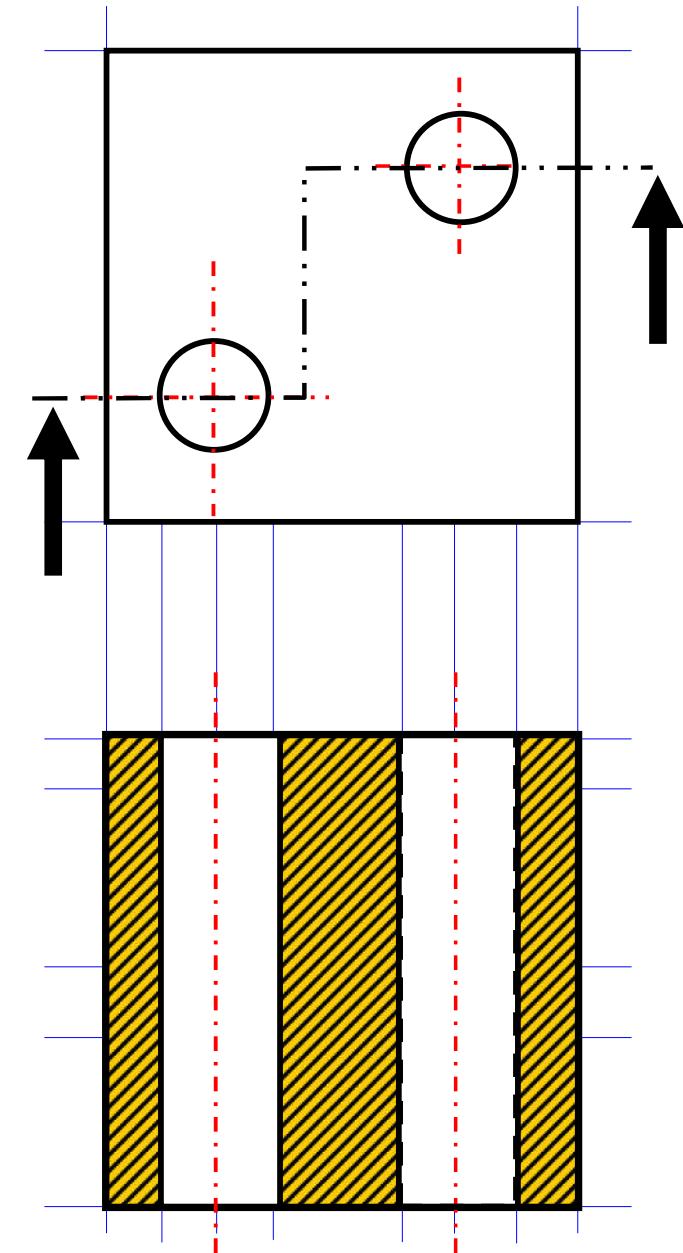
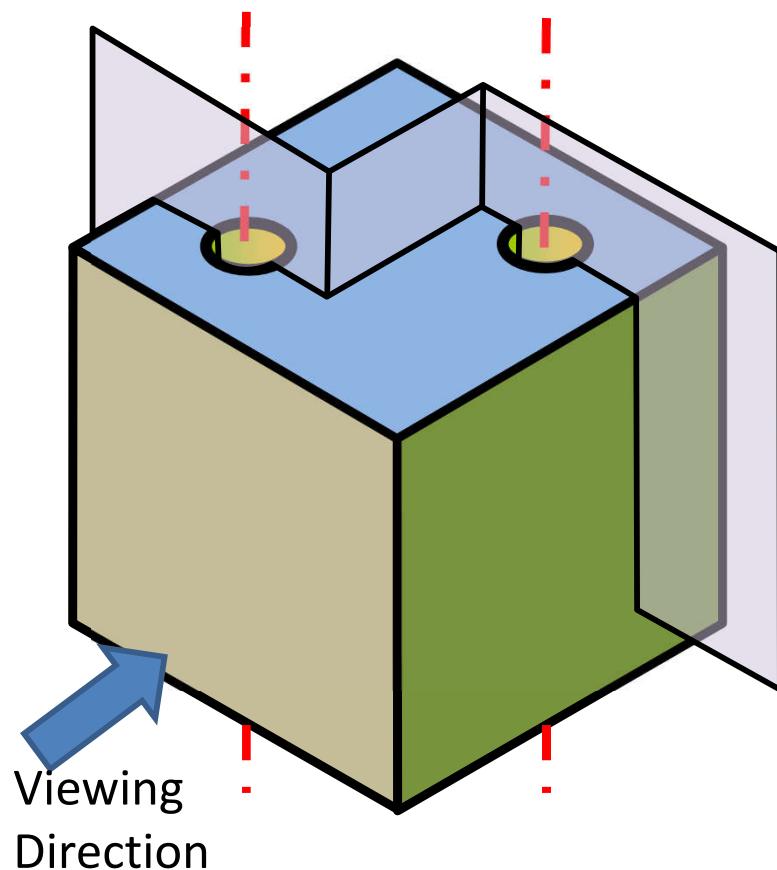
RIGHT

Example 1-Block With a Hole



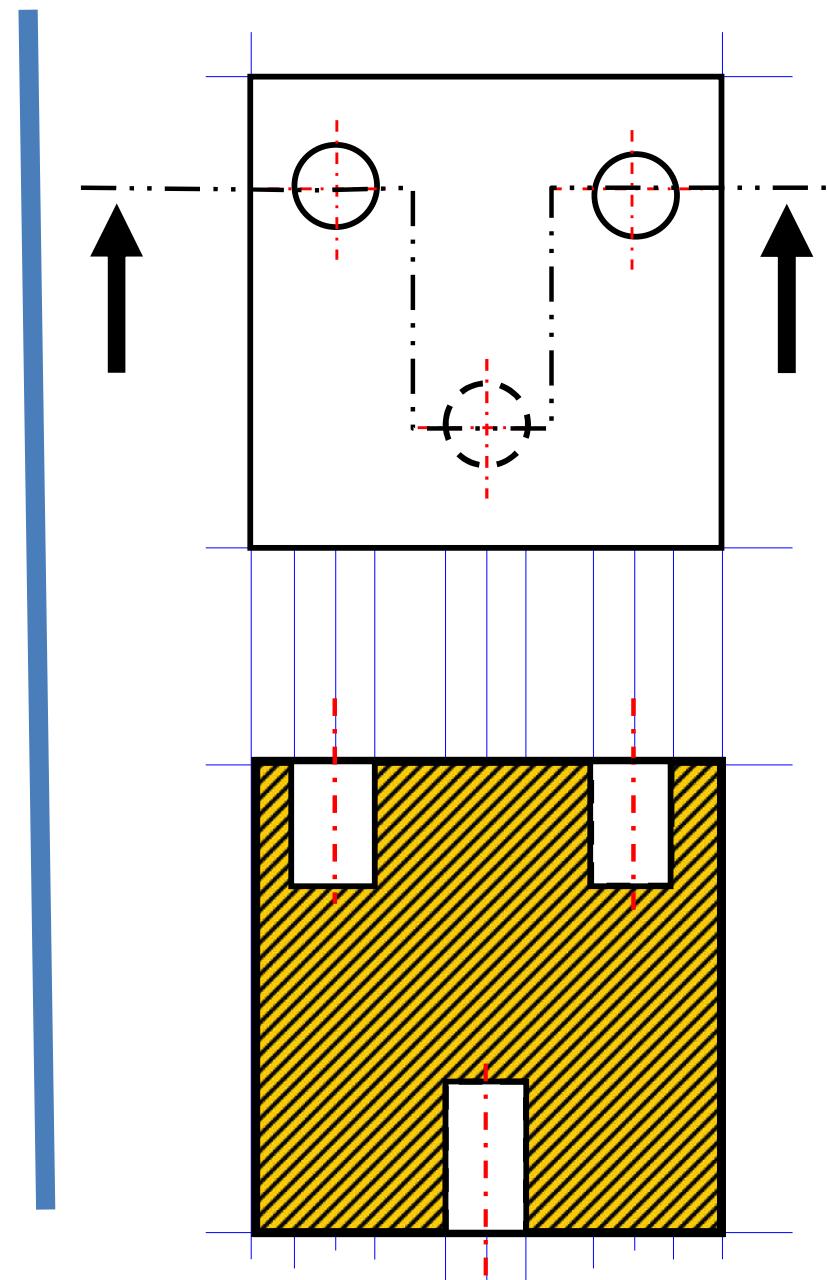
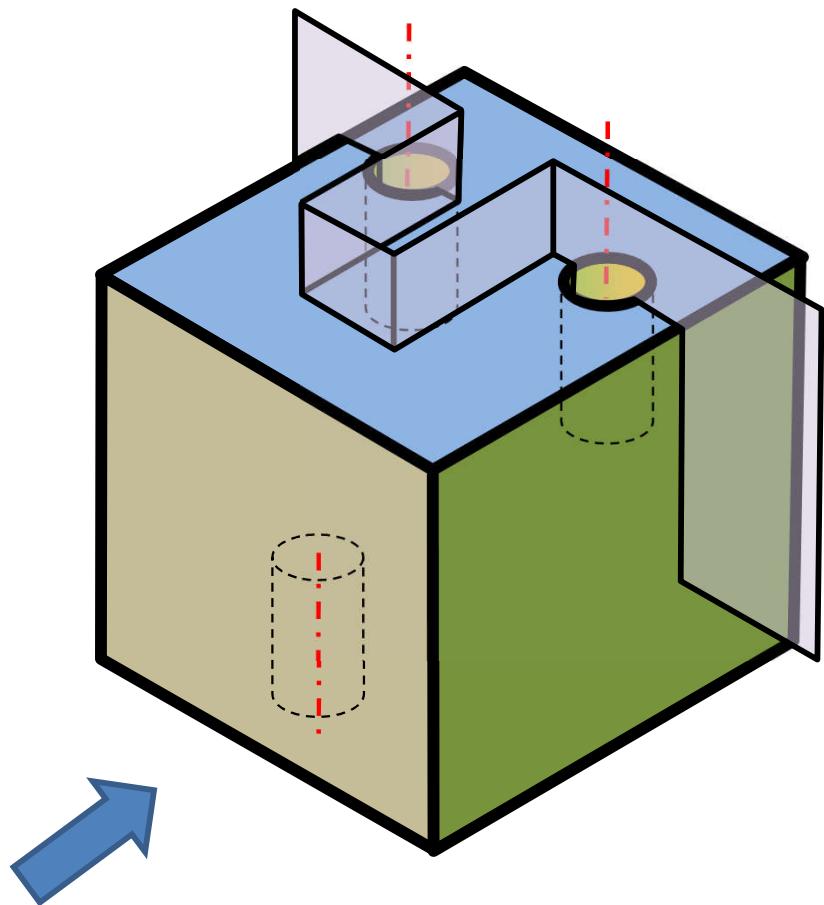
Example 2

- Block with two holes
 - Cutting plane to pass through both holes



Example 3

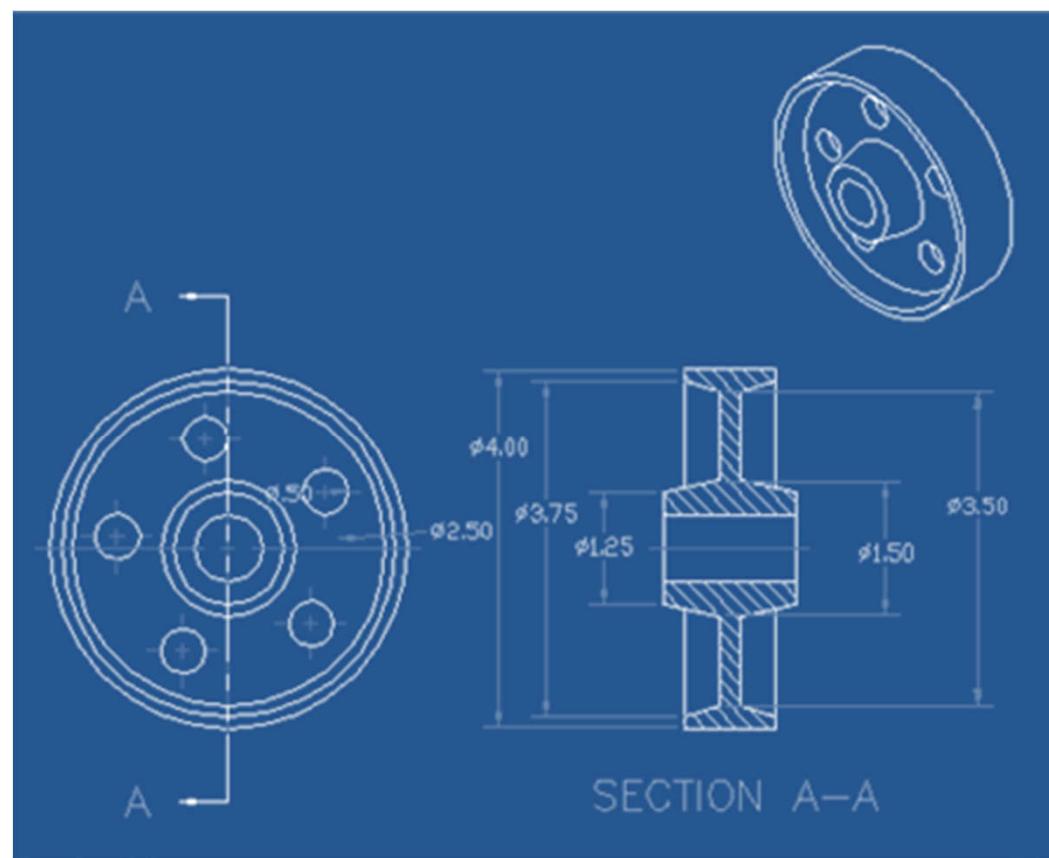
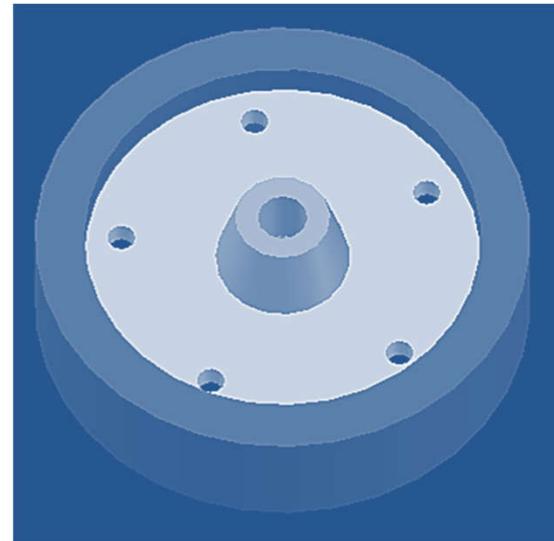
- Block with three holes



TYPES OF SECTIONS

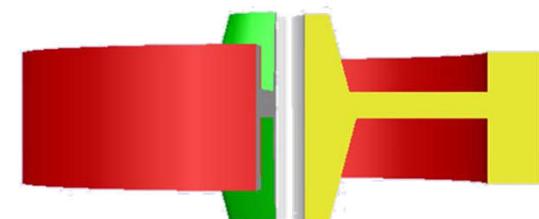
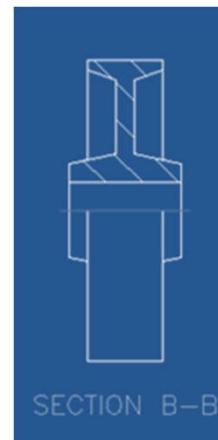
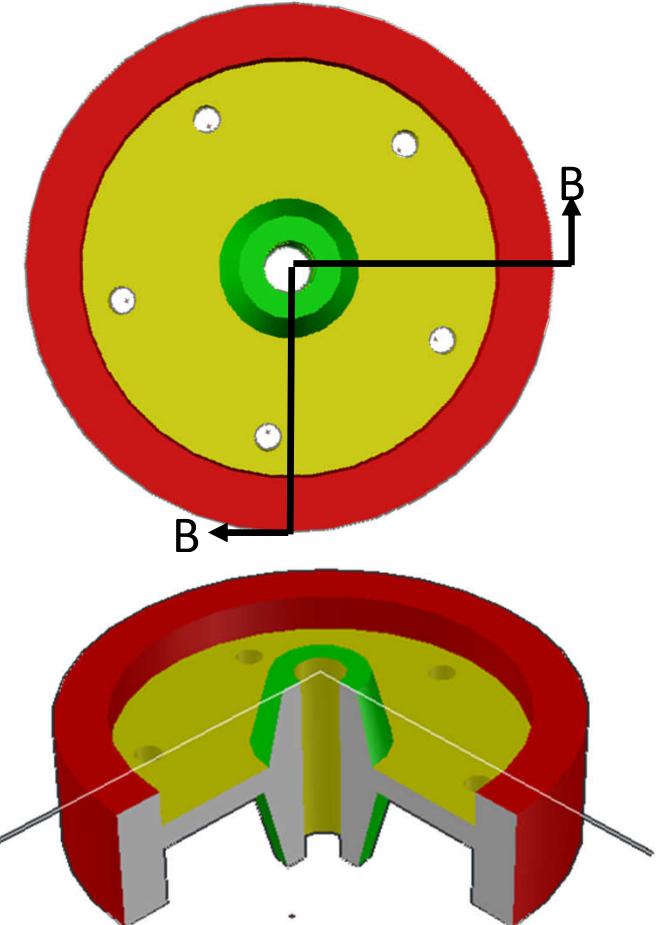
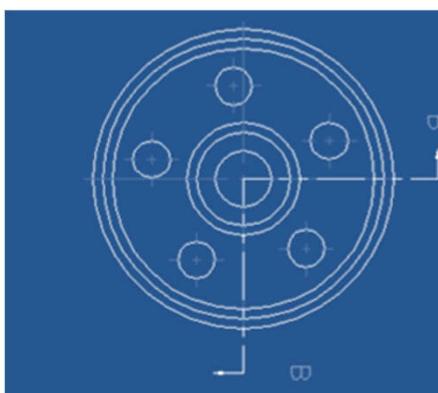
Full Section

- A sectional view is created by passing a cutting plane ***completely*** through a view



Half-Section

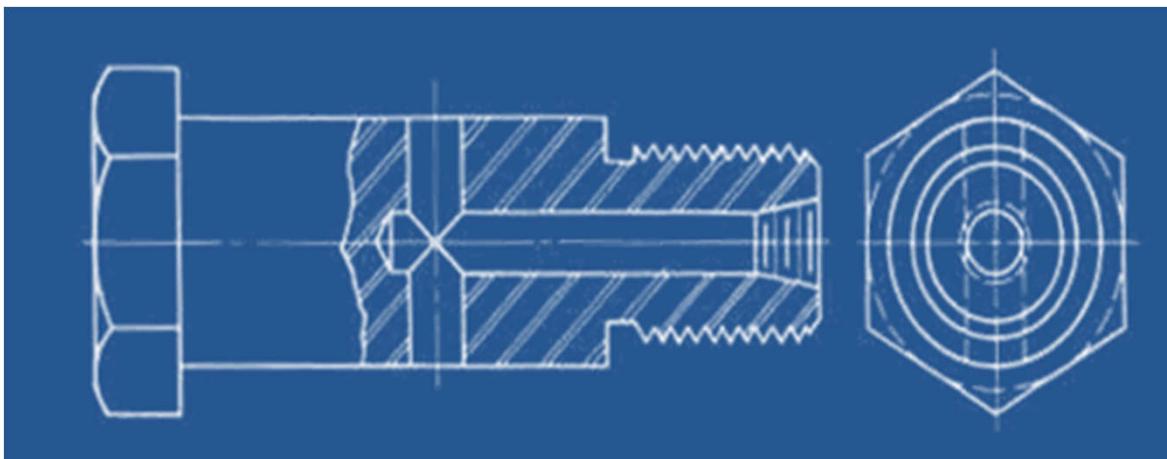
- Used for symmetrical objects
- Single cutting plane only half way through a view.
- One half of the view is sectioned; while the other half is un-sectioned.
- Cutting plane is imagined to extend halfway across, then forward
- Advantage: showing both interior and exterior in one view



Section - BB

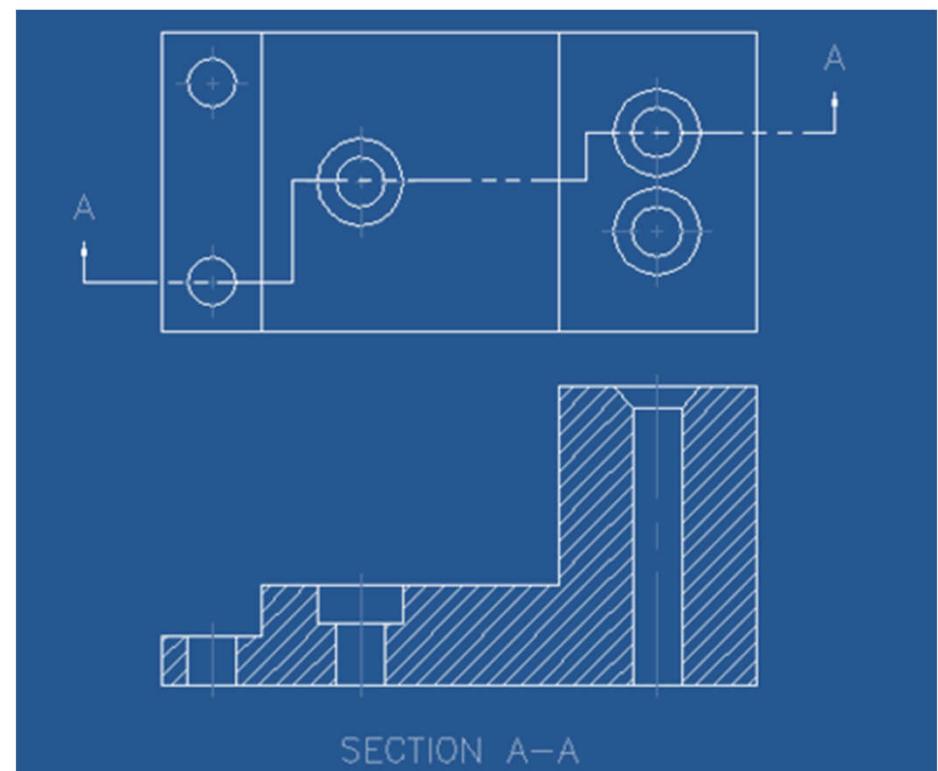
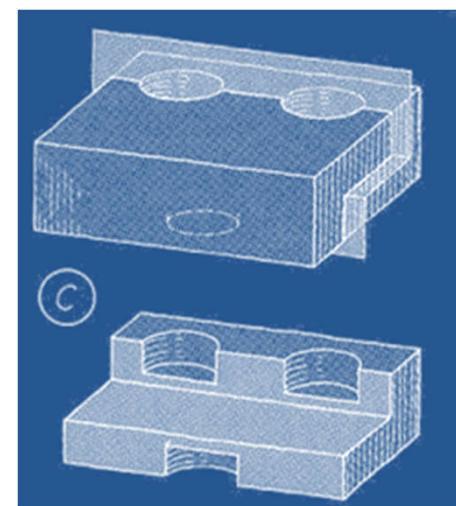
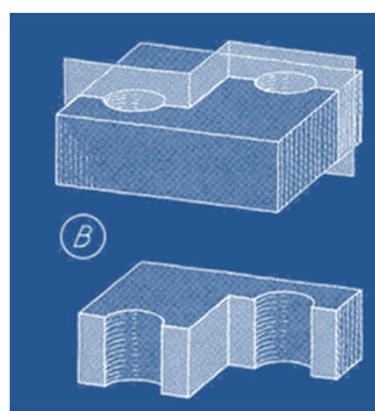
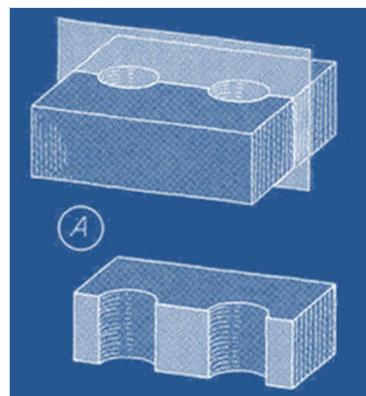
Broken-out Section

- A chunk of material is broken out.
 - Thus, we get a peek of the inside without cutting away the entire face of a part.
- Cutting plane is extended only so far as needed.
 - Full or half-sections are not preferred because cutting plane would remove some feature that must be included.

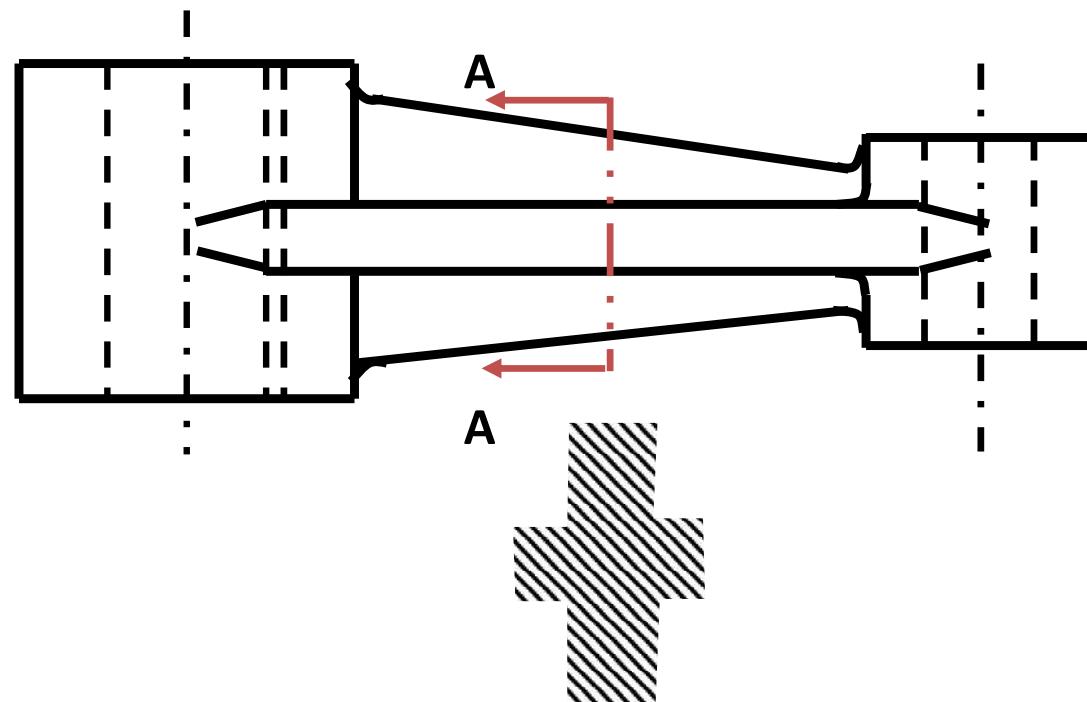


Offset Section

- Full section with the cutting plane making right angle bends through the parts to show details at different depth/height levels.

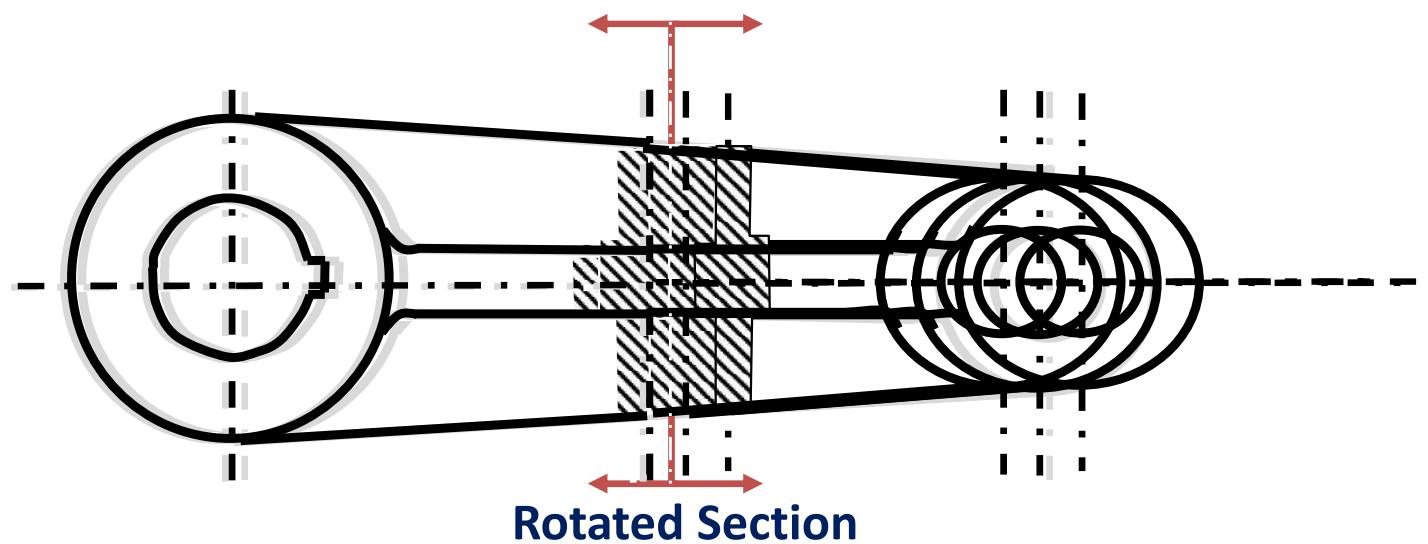


Rotated Section & Removed Section



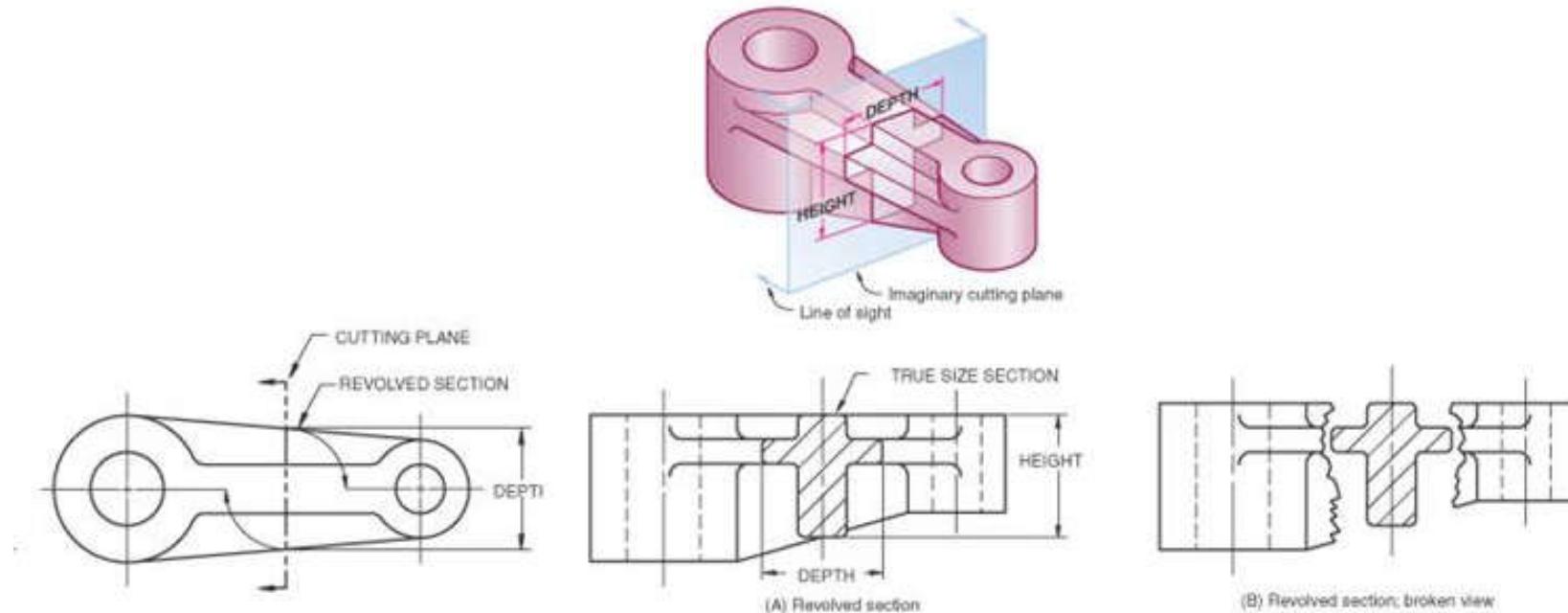
Removed Section

Removed
Section A-A



Rotated Section

Rotated or Revolved Section

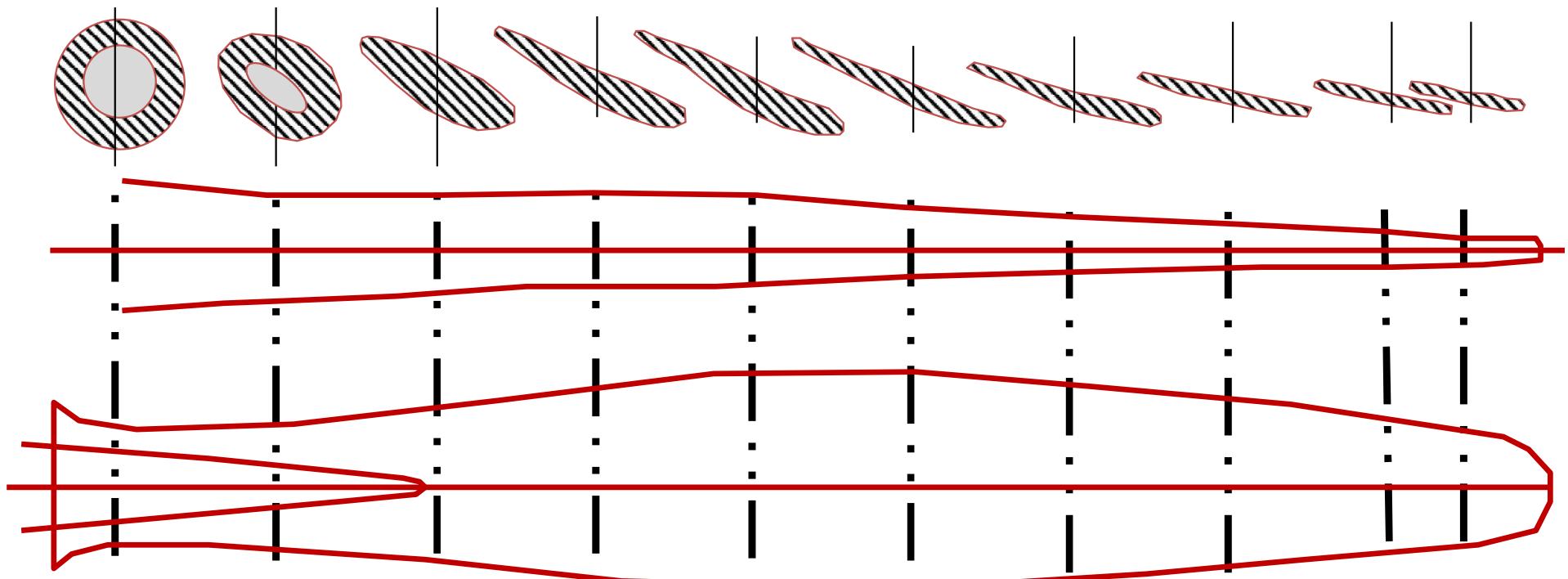


https://www.larapedia.com/engineering_quality_summaries/sectional_views_in_engineering_technical_drawings.html

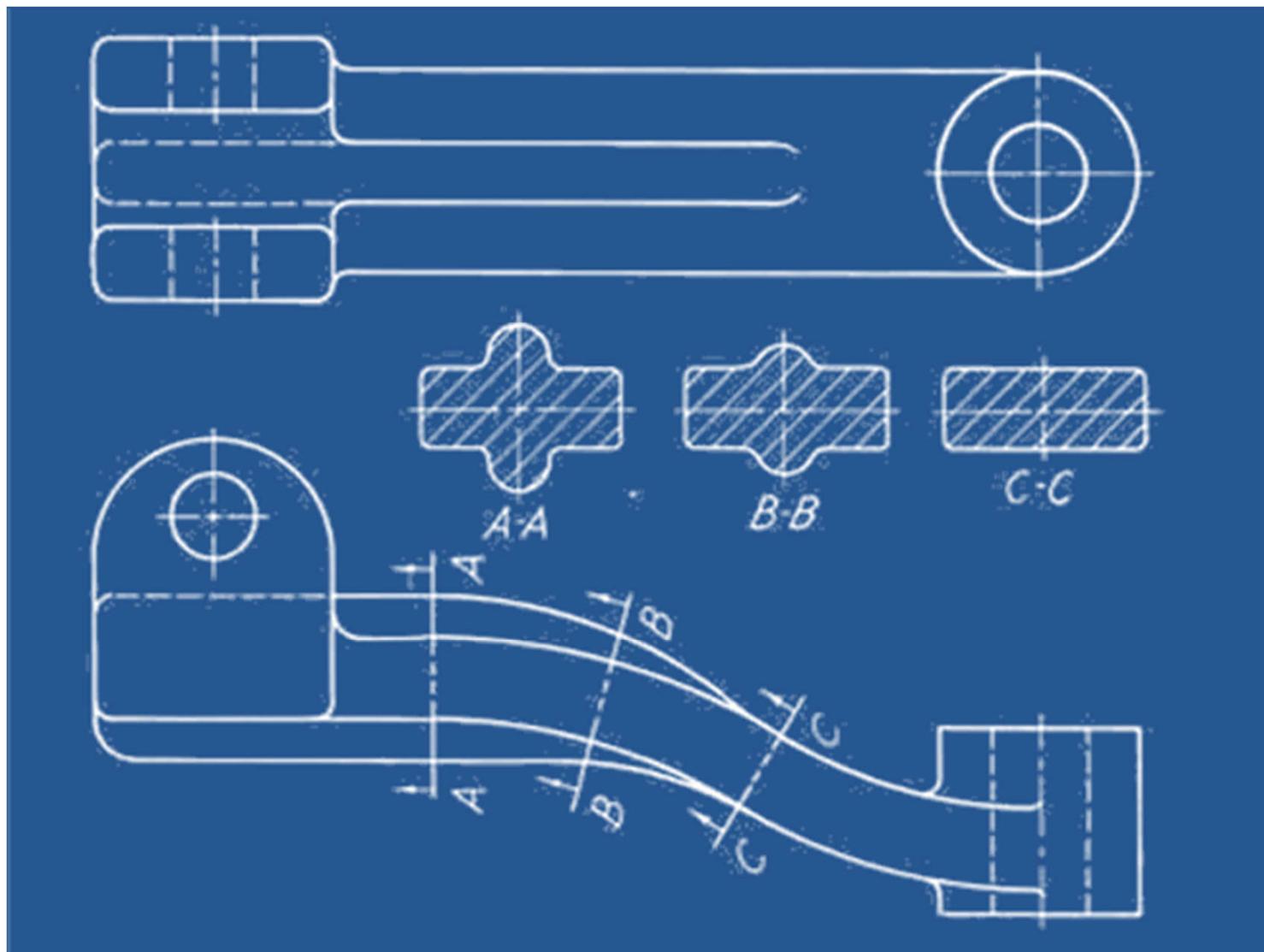
- To save space and to show view directly on main object
- Good to show different sections on elongated object
- If the revolved view does not interfere with other details in the view, keep it aligned with main object
- If interferes, show with broken object

Removed Sections

- Used for same purpose as rotated sections, but instead of being drawn on the same view, they are removed to some adjacent place on the sheet.

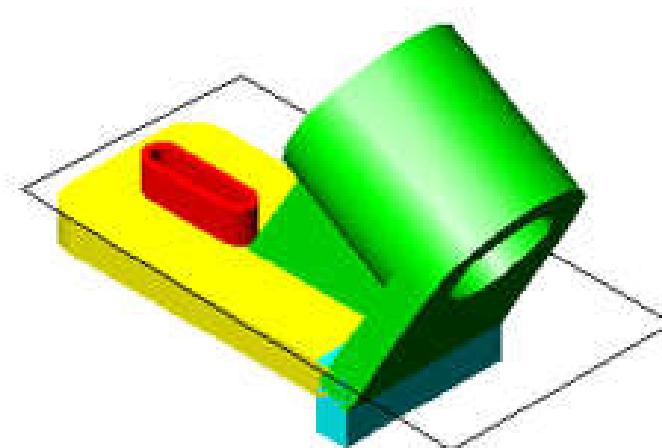
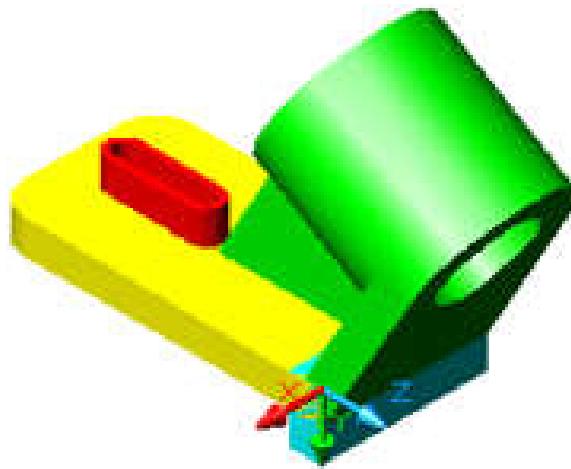


Removed Sections



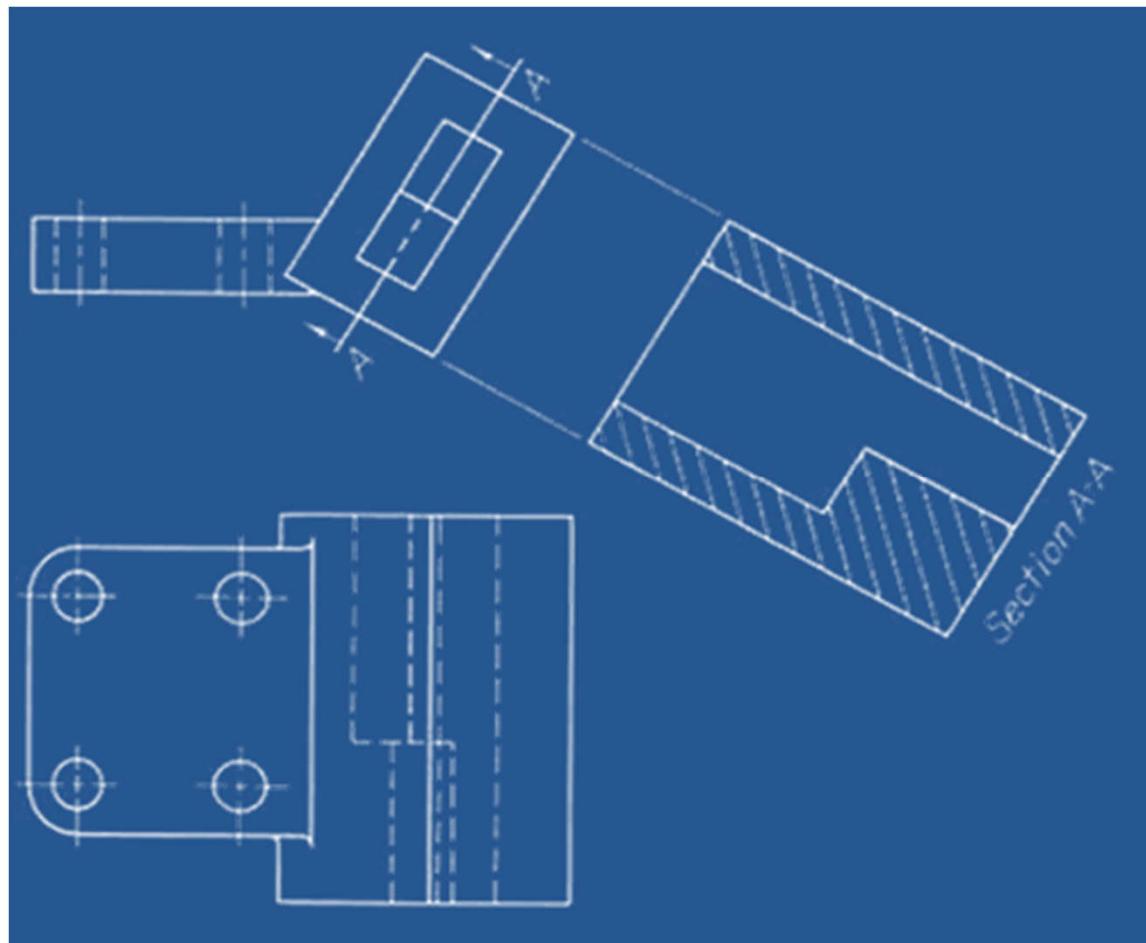
Auxiliary Section

- A section not along a principal face.

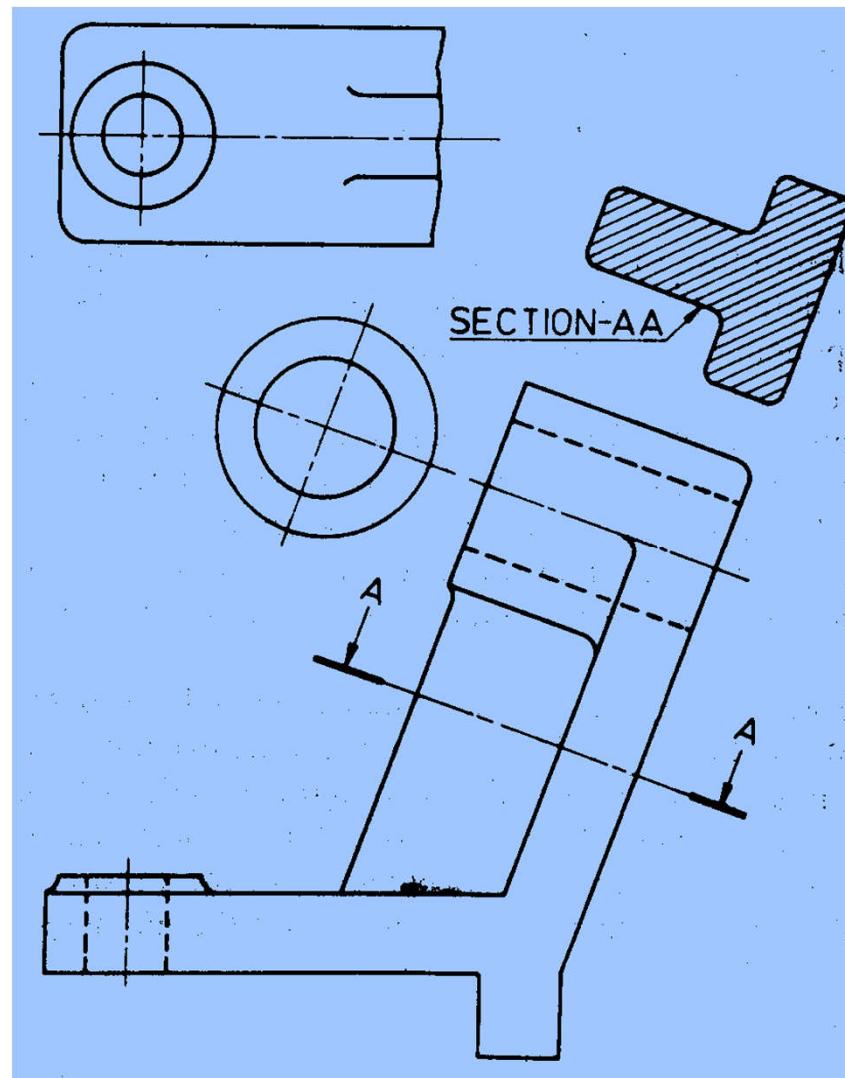


Auxiliary Section

- Cutting plane is in a position on an inclined feature
- All types of sections:
 - Full, Half, Rotated, Broken-out, Removed, etc.

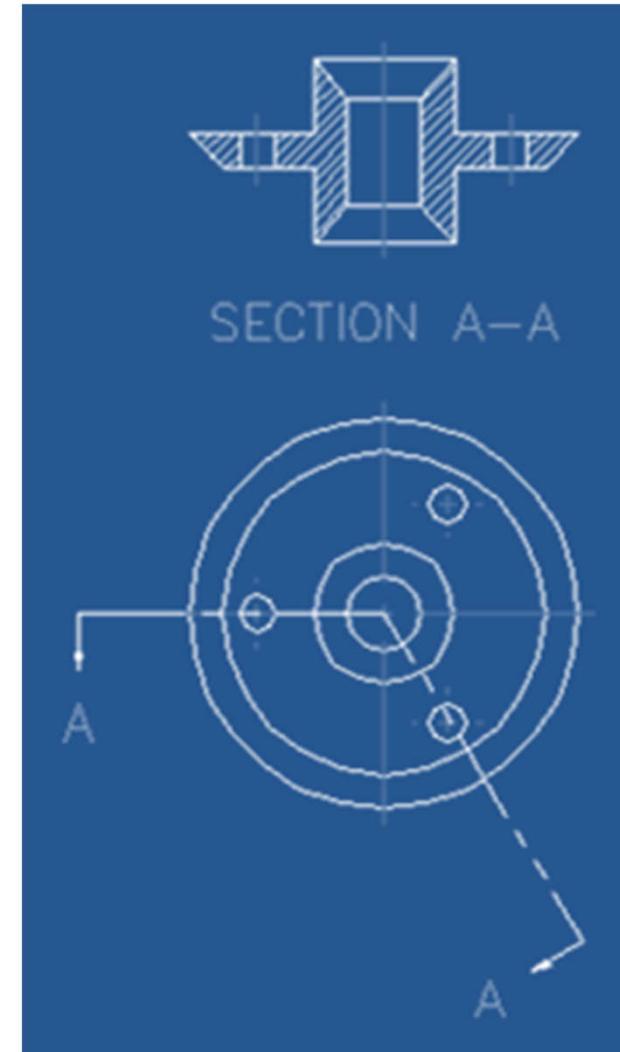
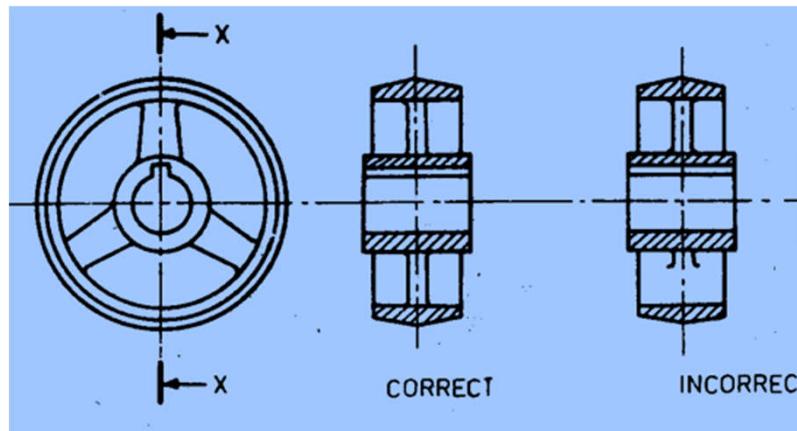


Auxiliary Section (Partial)



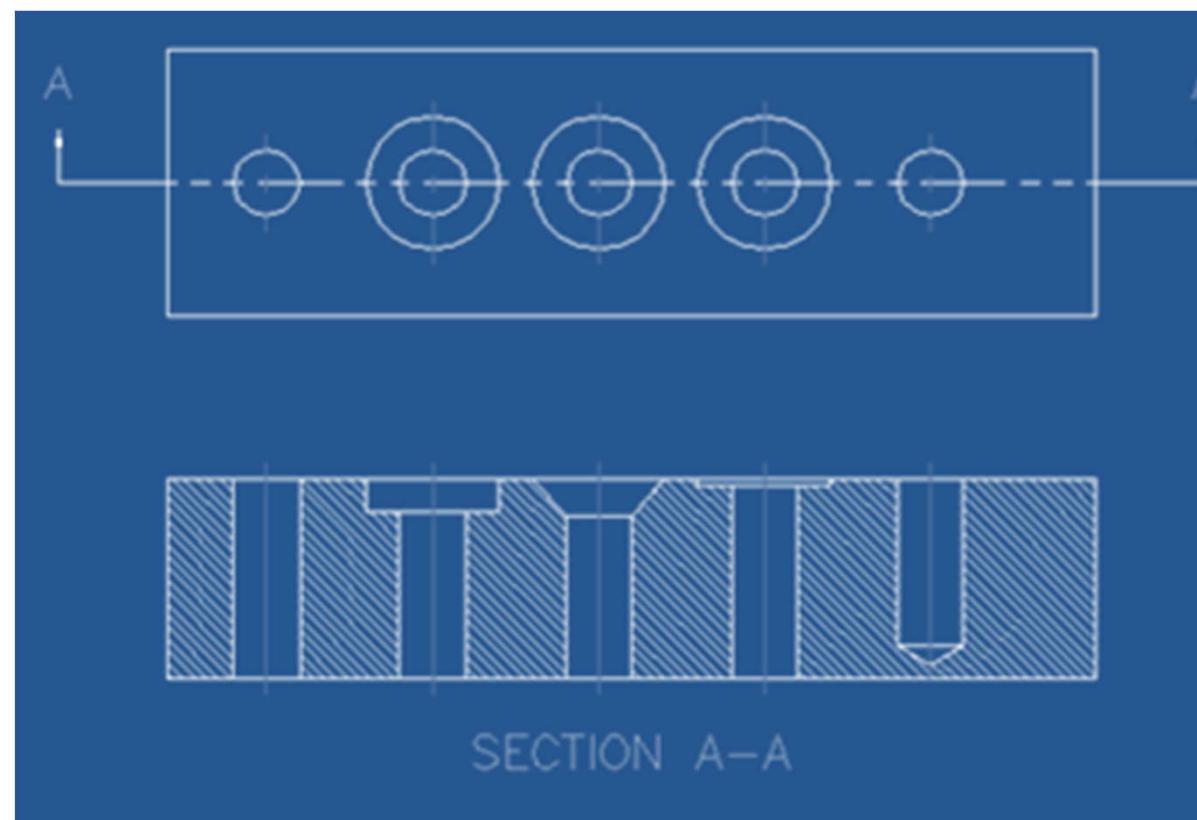
Aligned Section

- Cutting plane changes direction at an axis to pass through a feature which may not necessarily lie along a flat cutting plane through the body.
- In case of odd number of spokes in section, symmetry is shown in spoke.



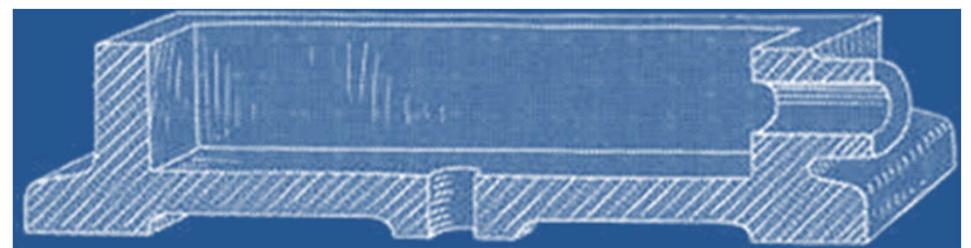
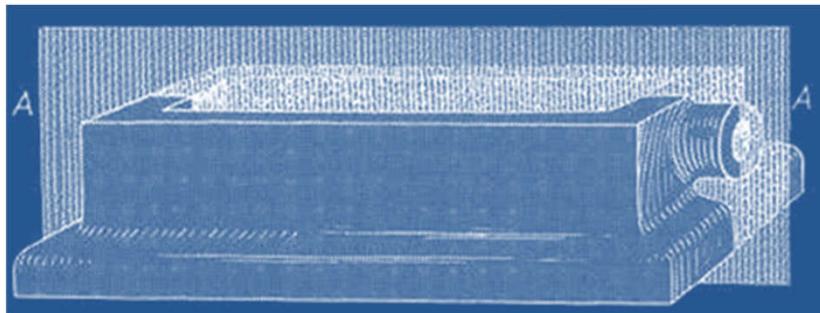
Drawing Practices for Sectional Views

- The edge of the cutting plane is shown in an appropriate view by the cutting plane symbol, with reference letters and arrows to show the direction in which the view is taken.

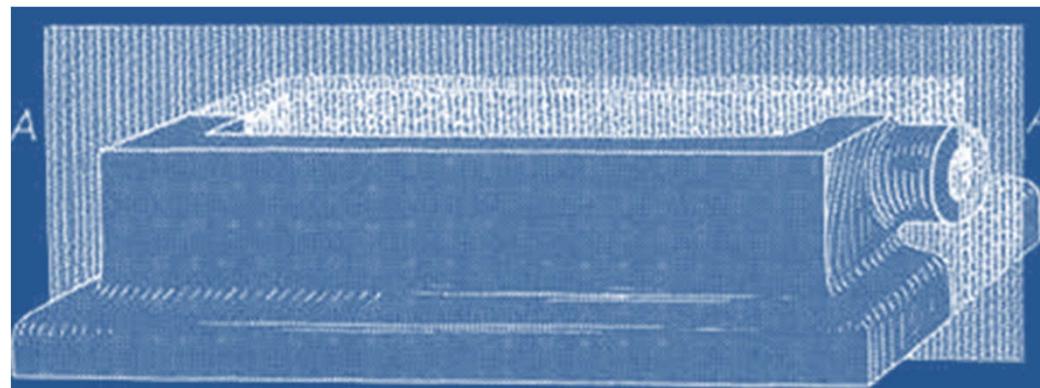


Drawing Practices for Sectional Views

- The nearer portion is assumed to be removed to make the sectional view.

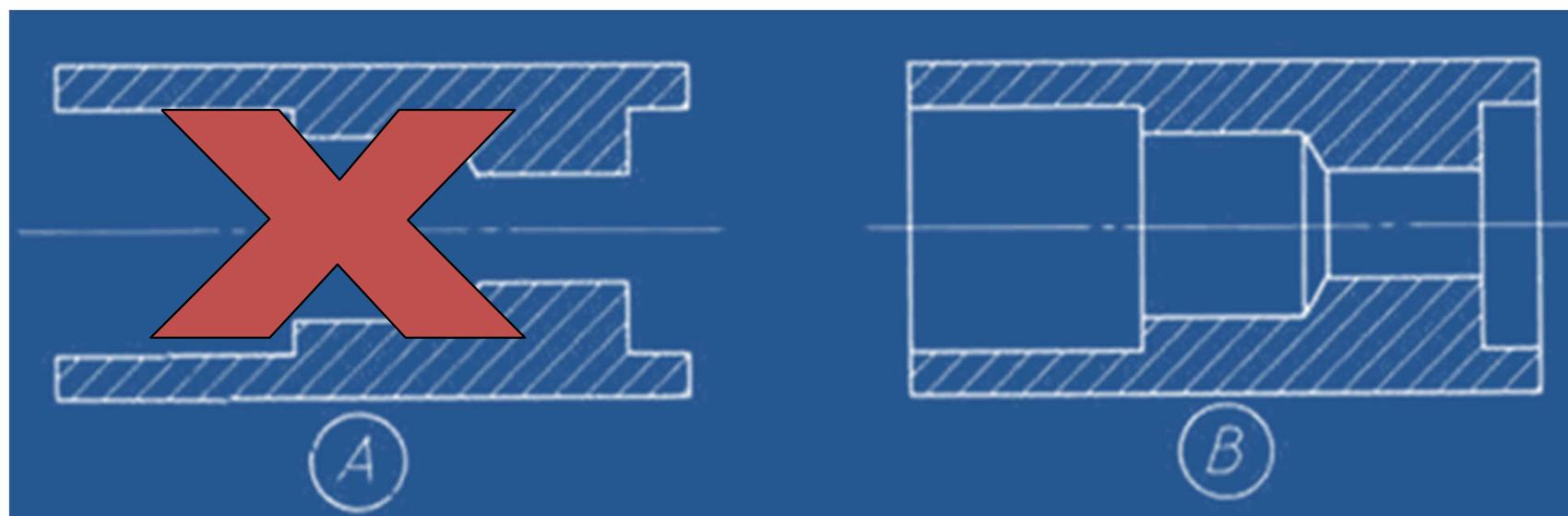
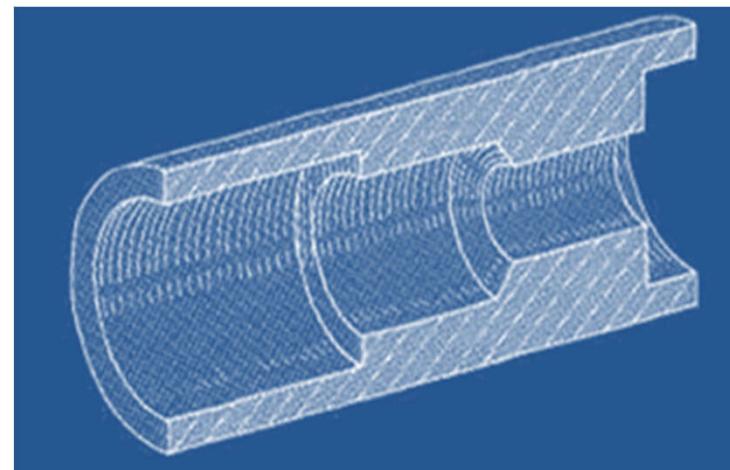


- The portion of the object assumed to be removed is not omitted while drawing other views.



Drawing Sectional Views

- Visible details shown in sectional views

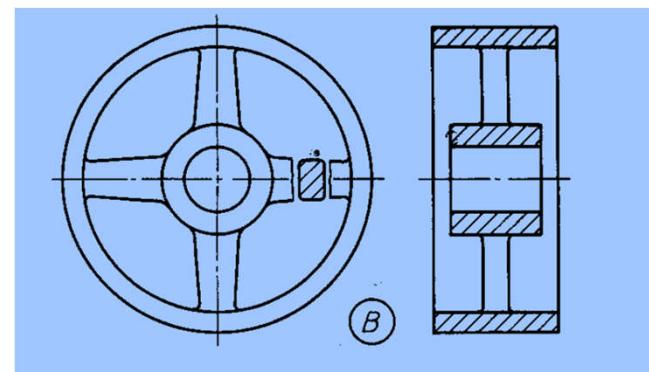
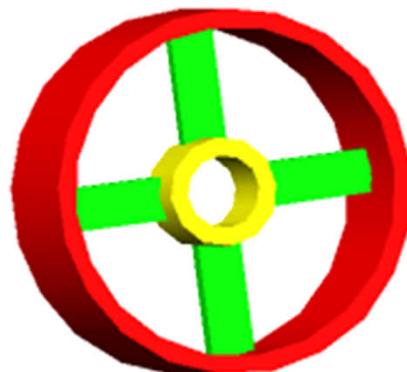
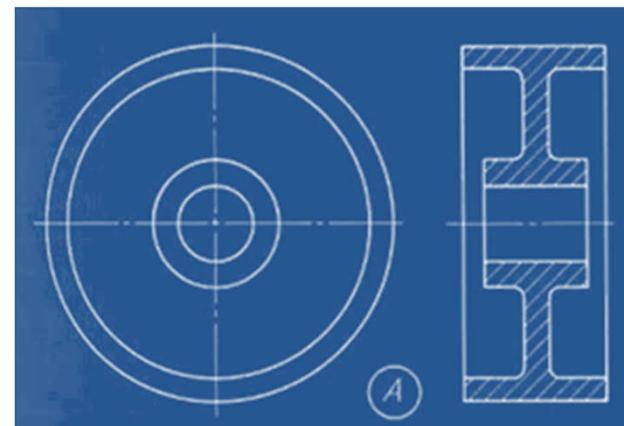
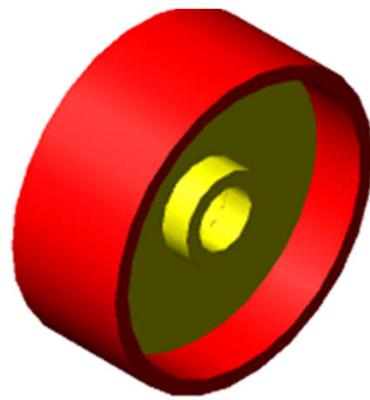


Parts NOT Sectioned

- Any element which is not continuous (not solid) around the axis of the parts should be drawn without hatching, e.g. spokes and arms, ribs, lugs, etc.

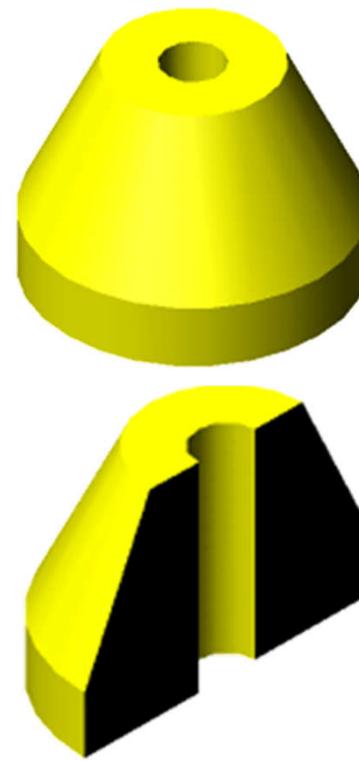
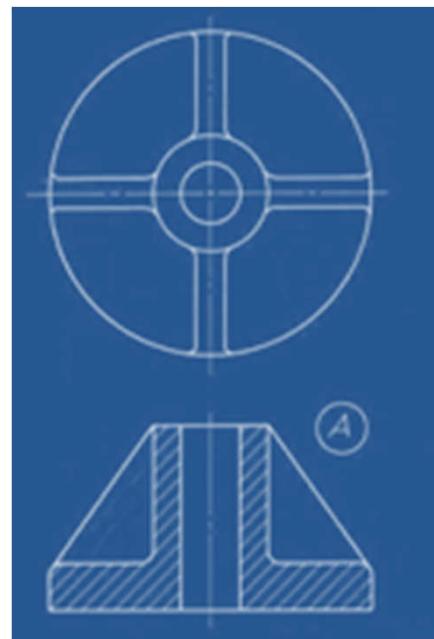
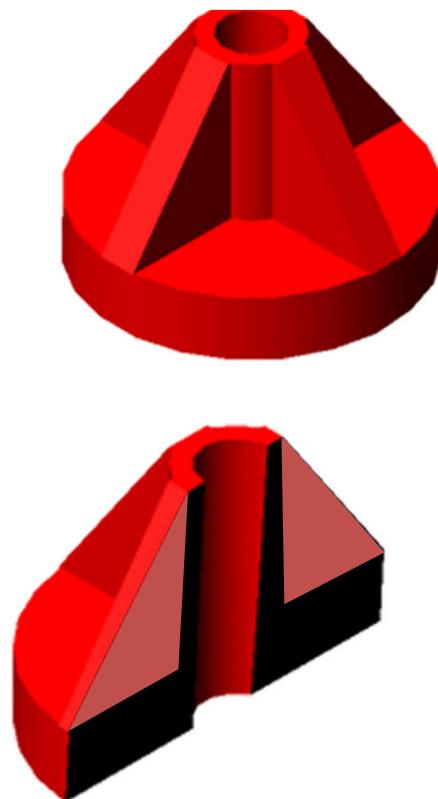
Parts NOT Hatched

- Spokes are not hatched



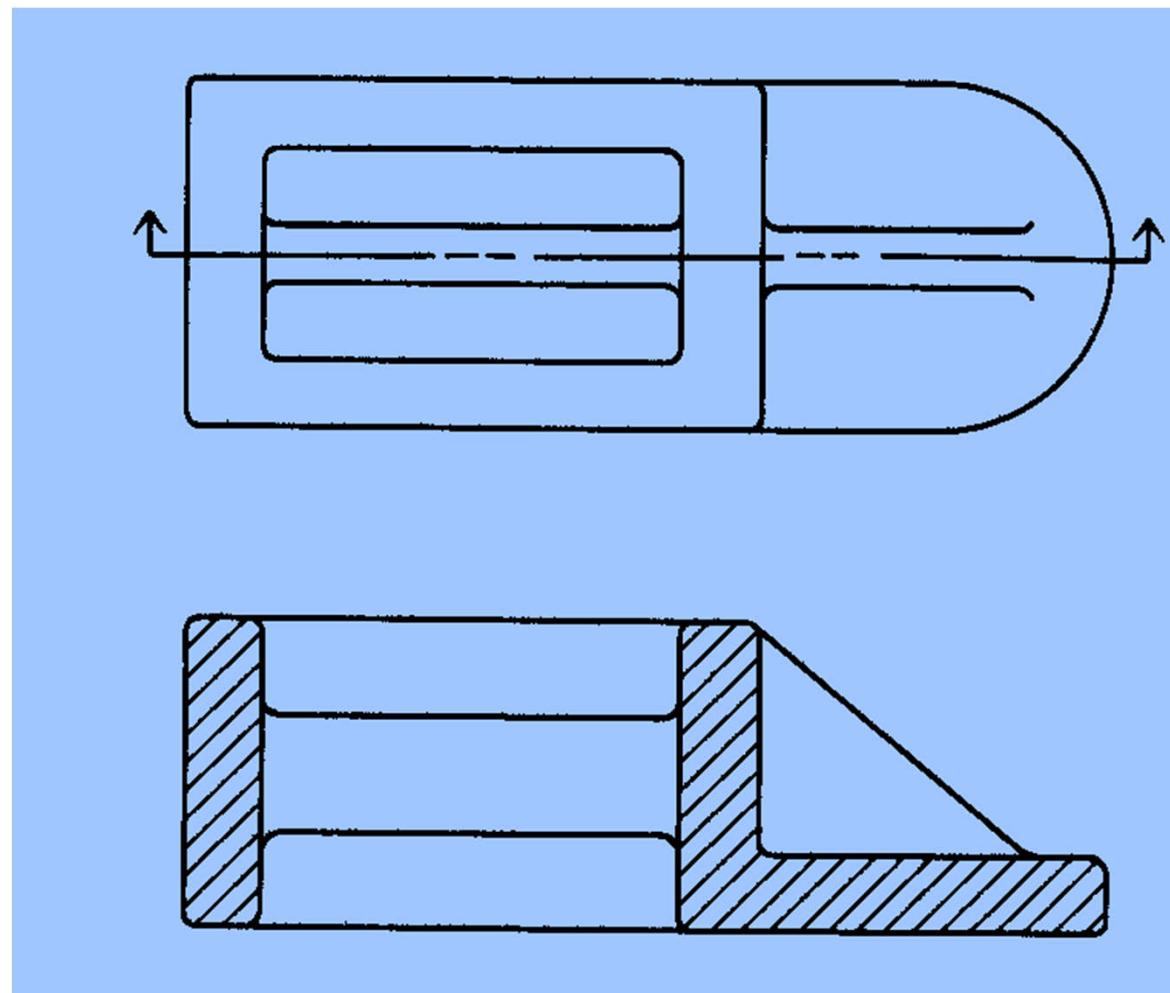
Parts NOT Hatched

- Ribs are not sectioned: otherwise they give the impression of a solid part



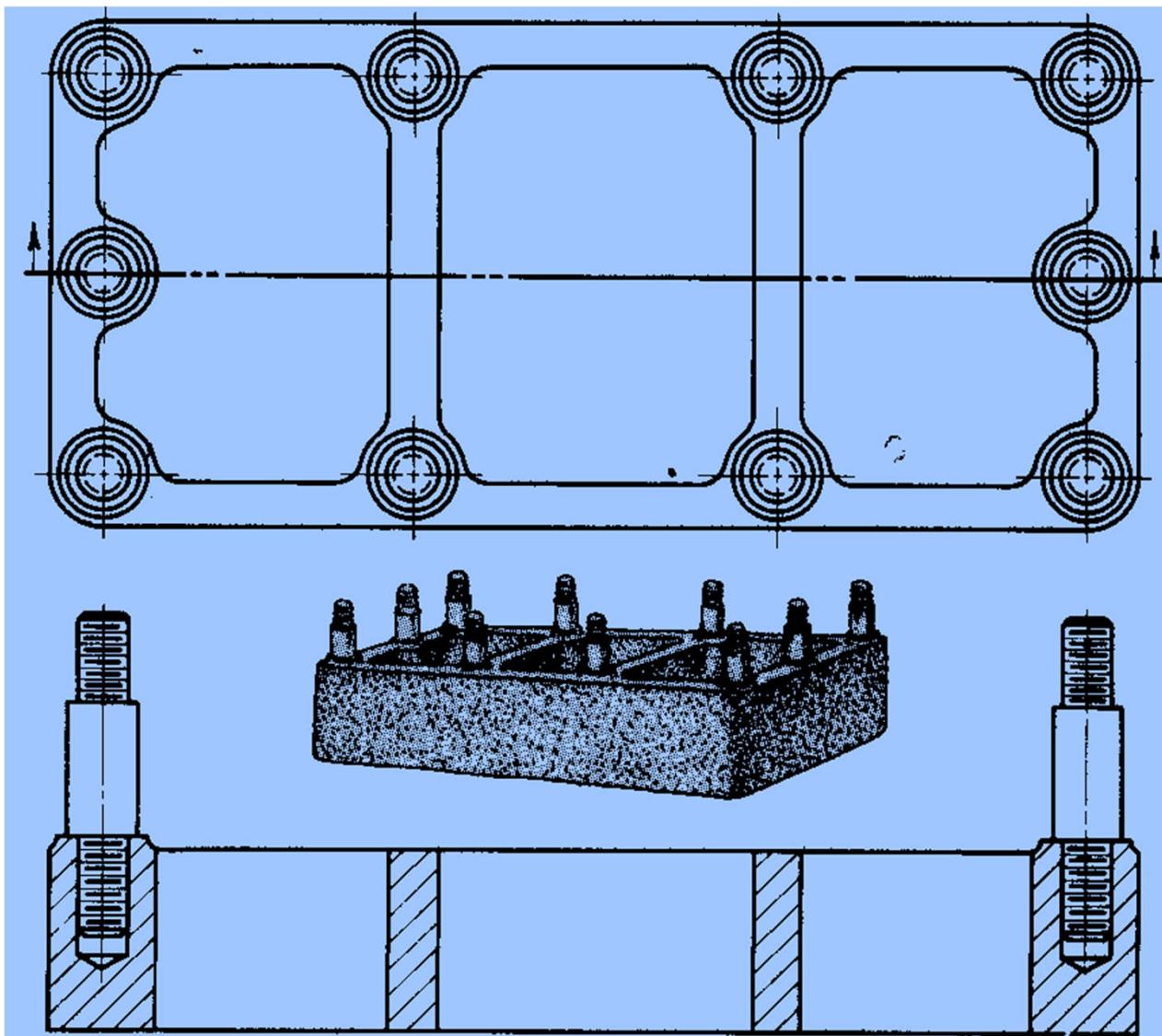
Parts NOT Hatched

- Ribs not sectioned in longitudinal section (along axis)



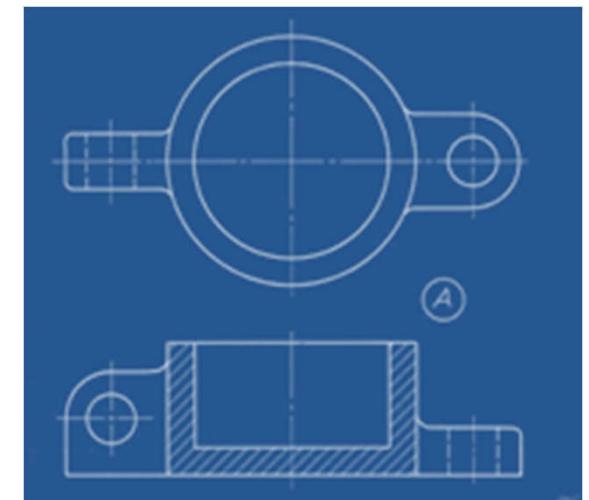
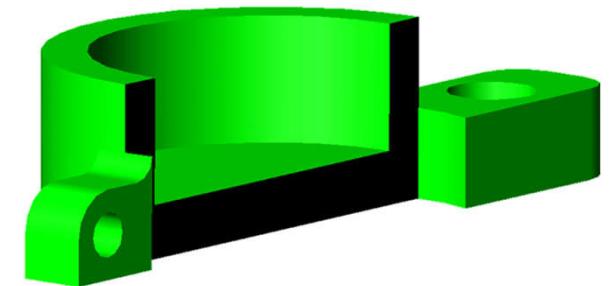
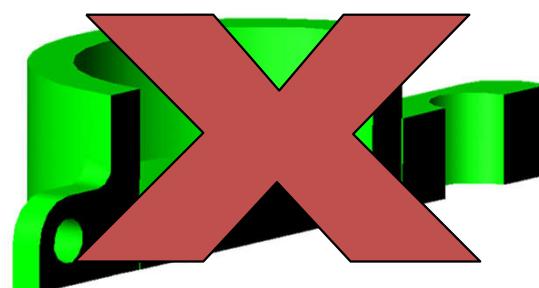
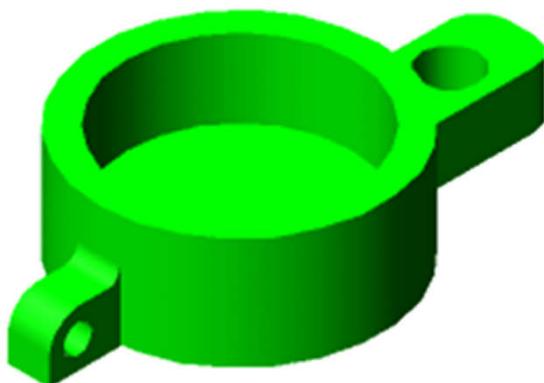
Parts NOT Hatched

- Ribs are hatched in transverse section

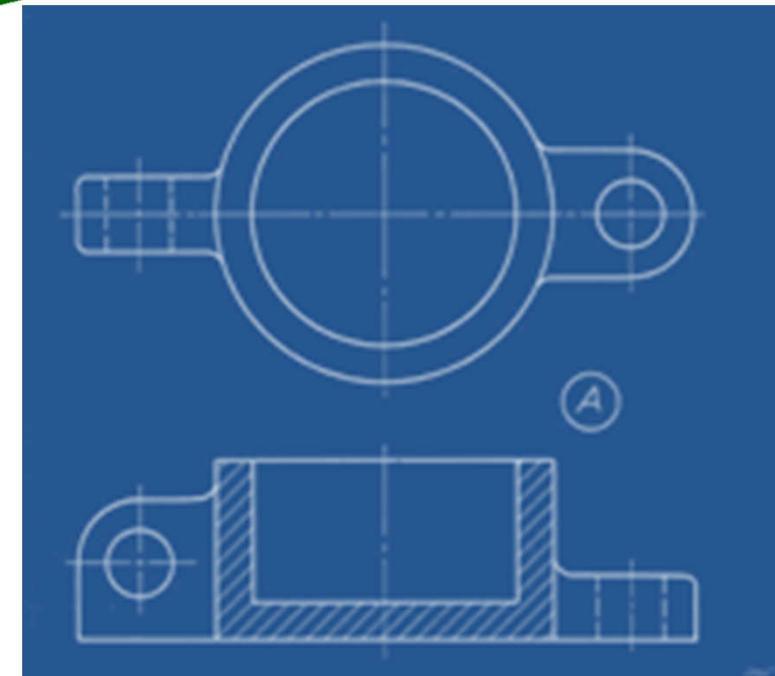
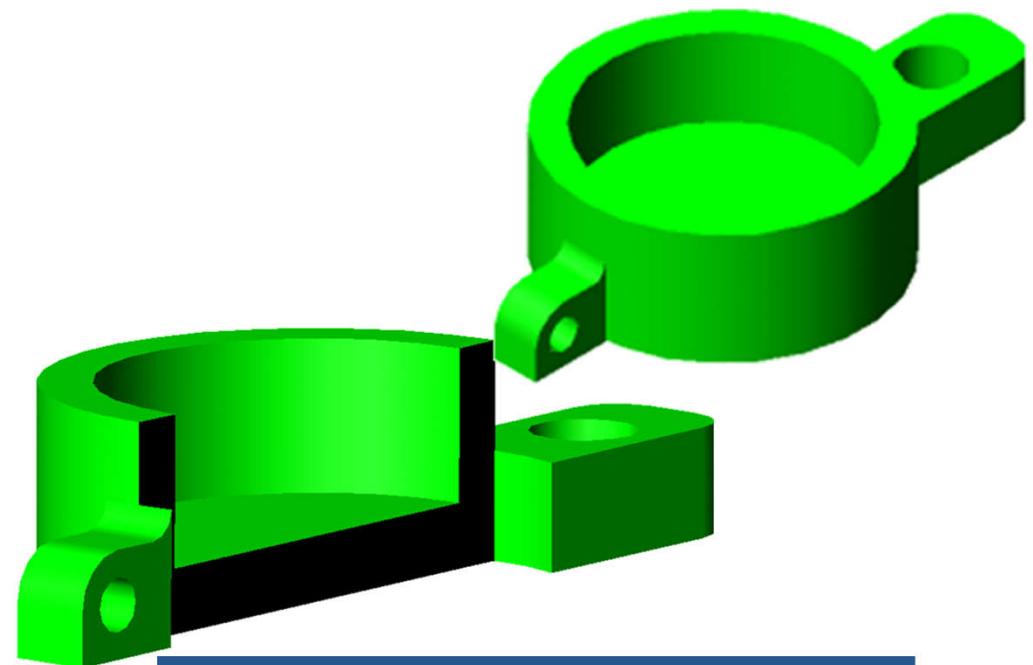
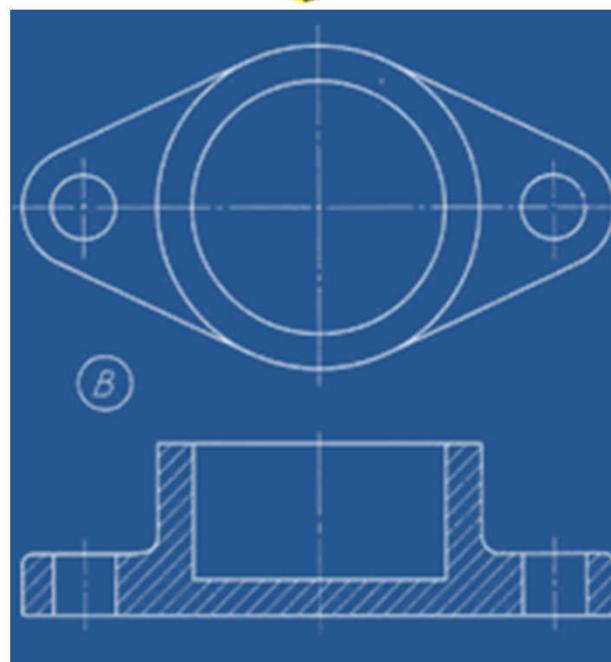
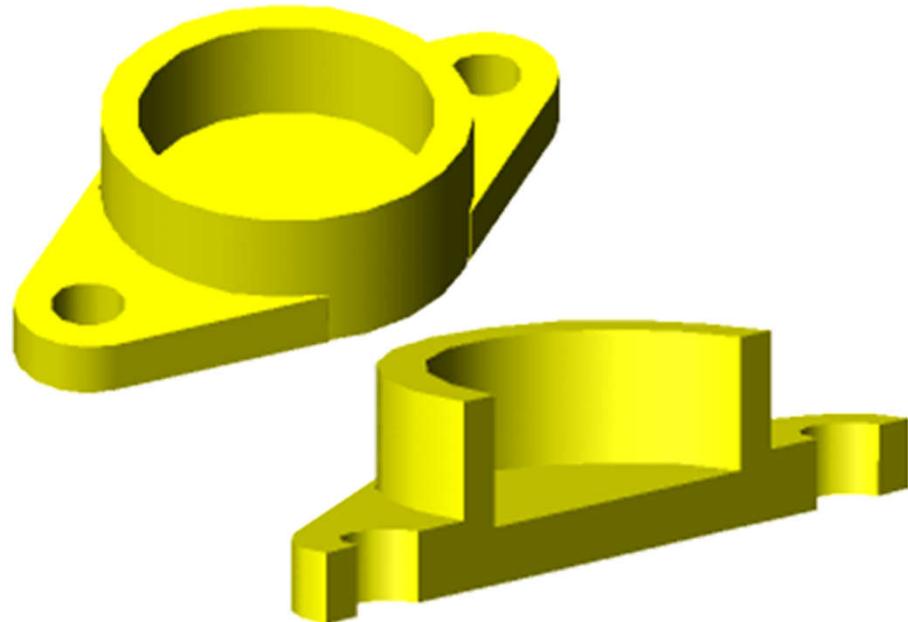


Lugs in Section

- Lugs are not hatched

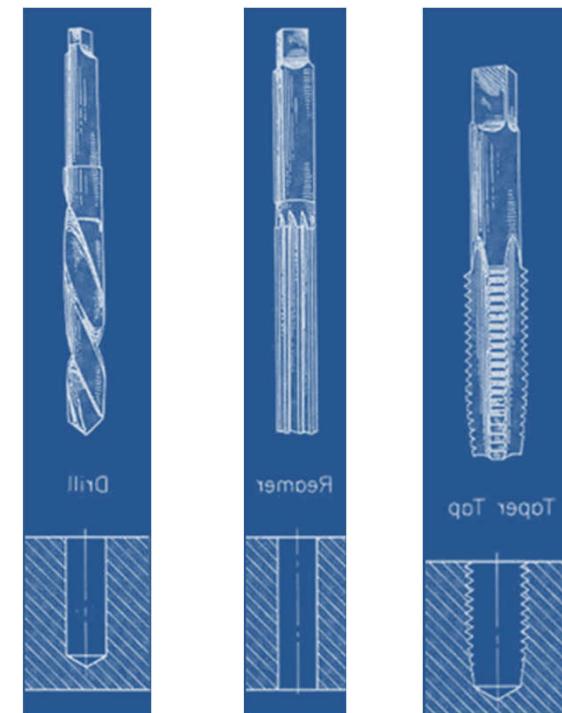
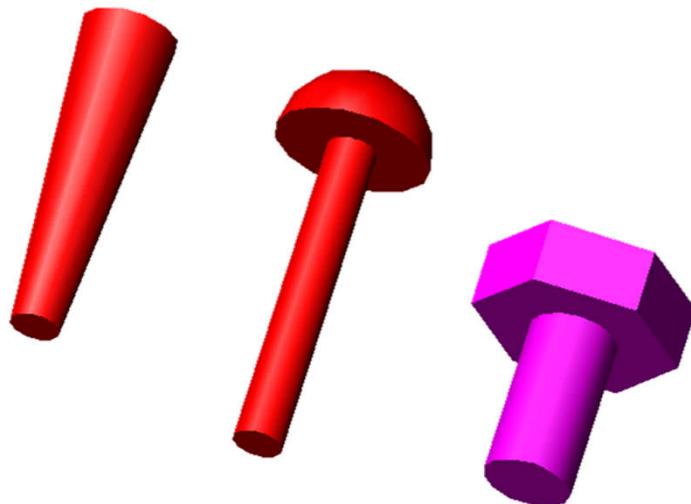


Base Plate vs Lugs



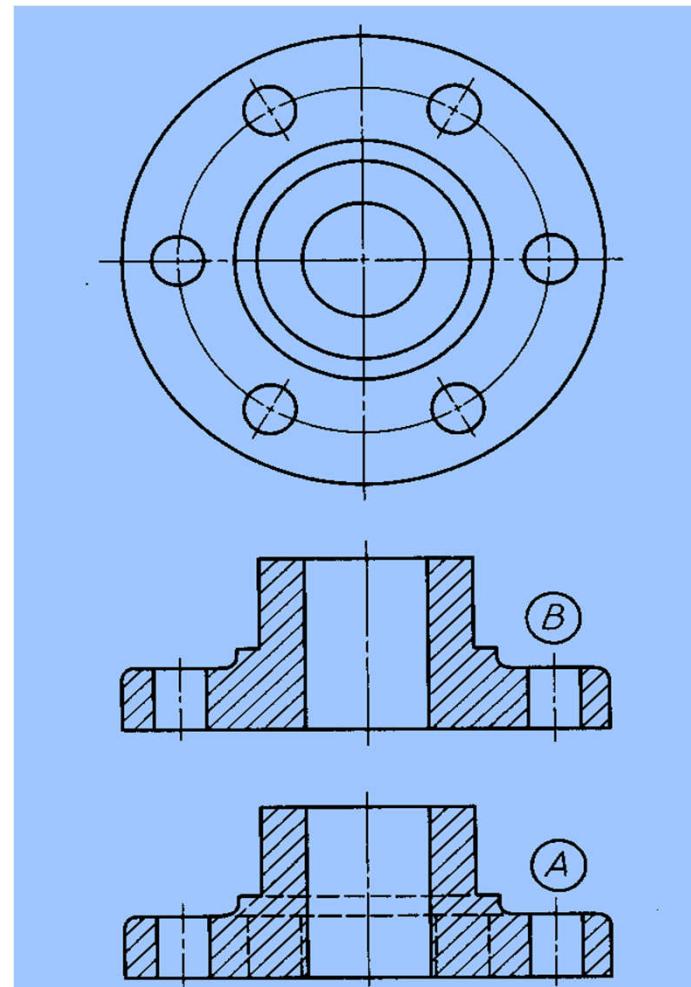
Parts NOT Hatched

- Parts having no internal construction – such as fasteners, pins, shafts, bolt heads, rivet heads, etc. (should not be hatched);



Hidden Lines

- Hidden lines are not shown in sectional views (unless absolutely necessary)



Hidden lines leads to confusion.
B is better than A

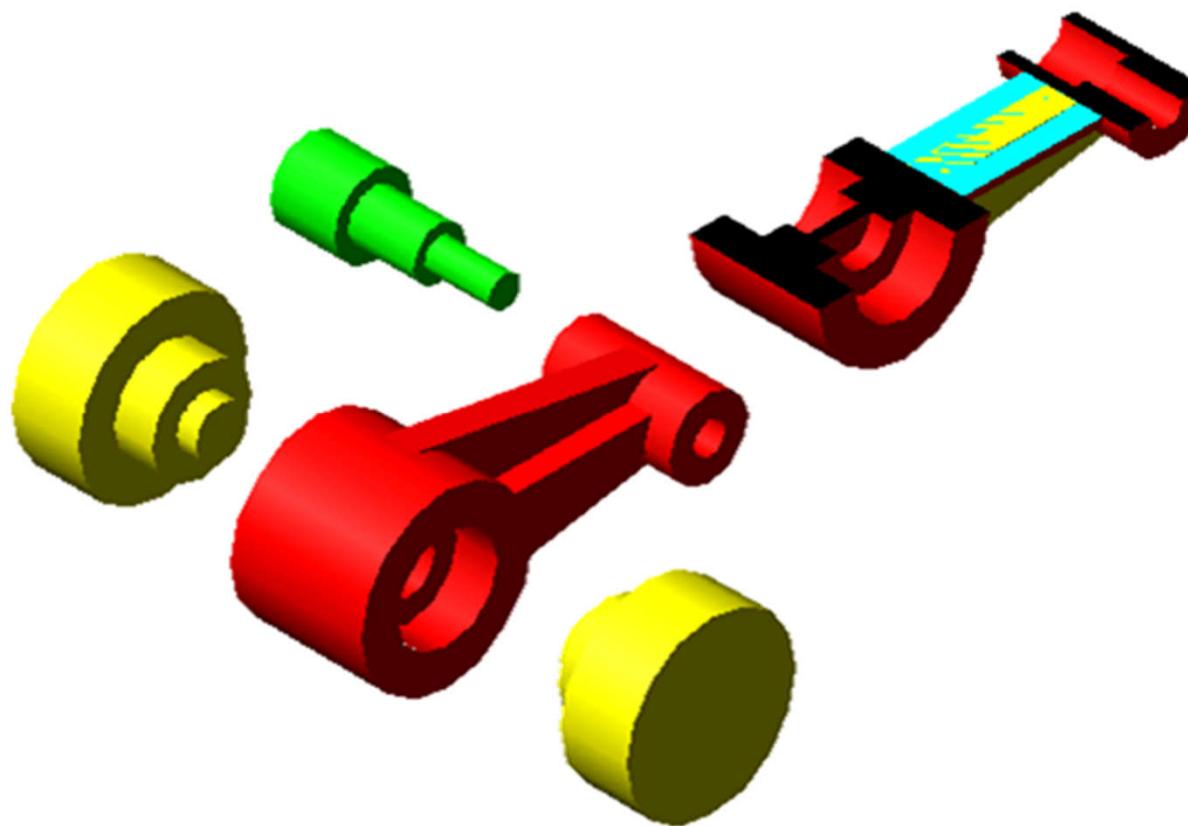
Important Note

1. Sections are to be used only if some new information is revealed
2. Use half section only, if full section will not reveal any new information
3. Sections should be hatched appropriately
4. NO HIDDEN lines are to be shown in sections

Assemblies

Section Views for Assemblies

- Made up of combination of parts.
- All types of sections as discussed earlier may be used.
 - Cutting plane is often offset.



Assembly Drawings

- A system made up of many parts joined together in relation to each other.
- Assembly drawing: Provides a comprehensive view of how different parts relate to each other in the assembly.
 - Individual parts
 - Sub-assemblies
 - Positions of specific parts in particular position
- A drawing may be viewed for a particular purpose: manufacturer, customer, information

Assembly of a Cycle



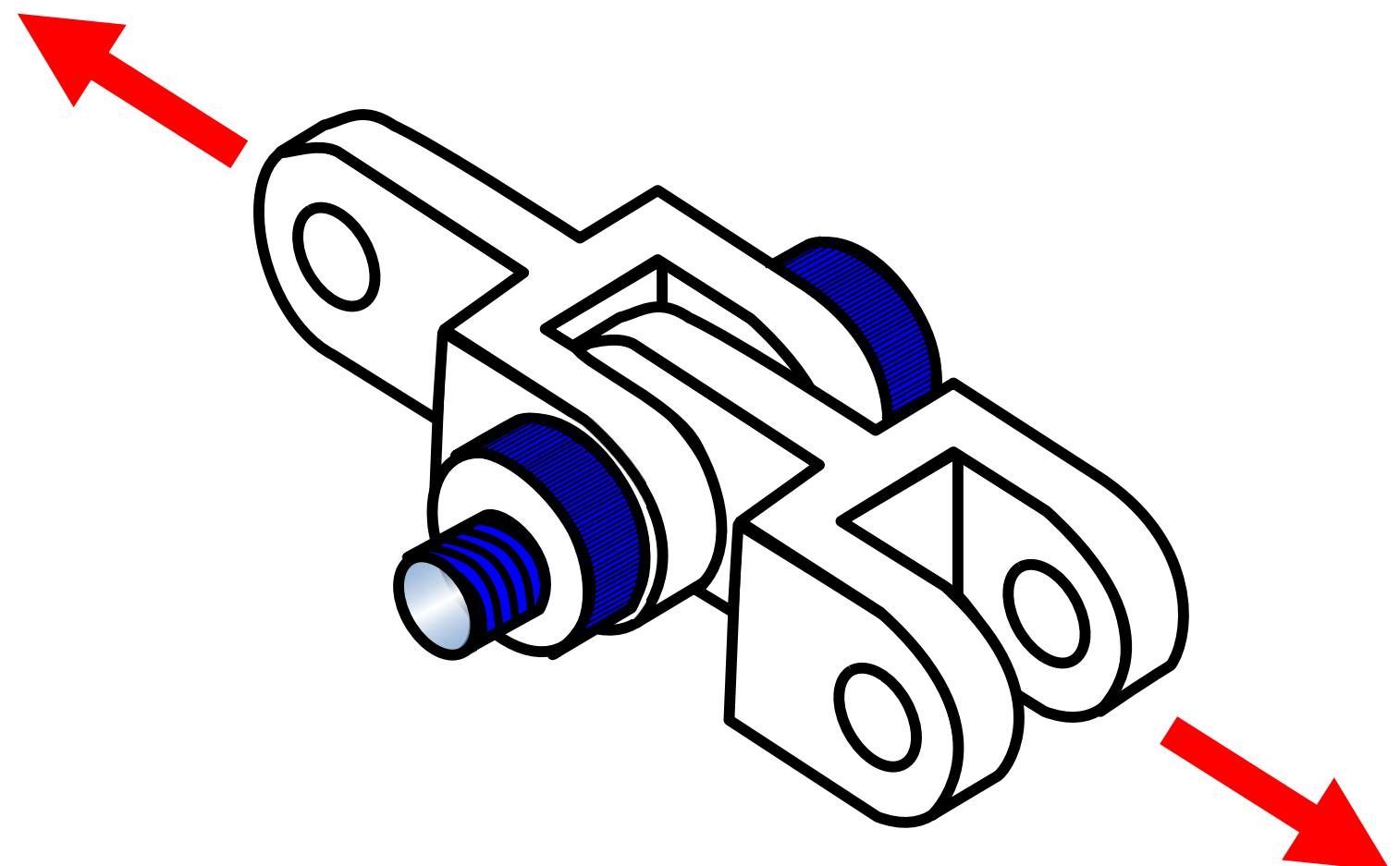
Assembly of a Wheel





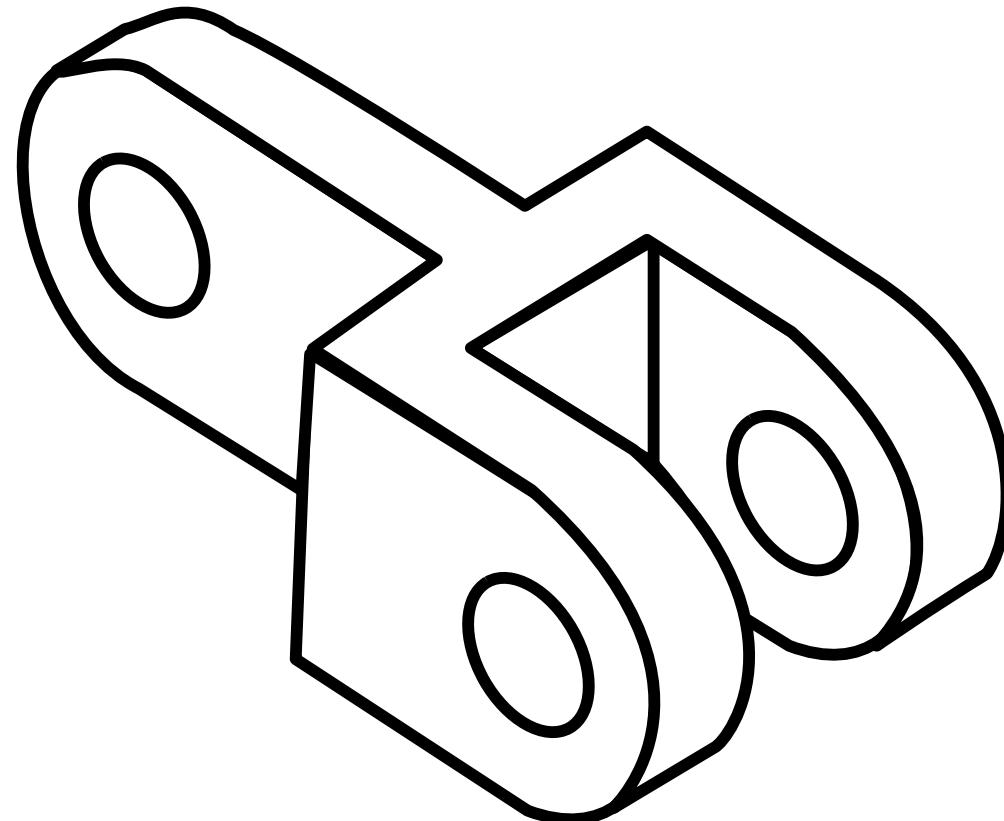
Sectional Assemblies

- Single lug chain



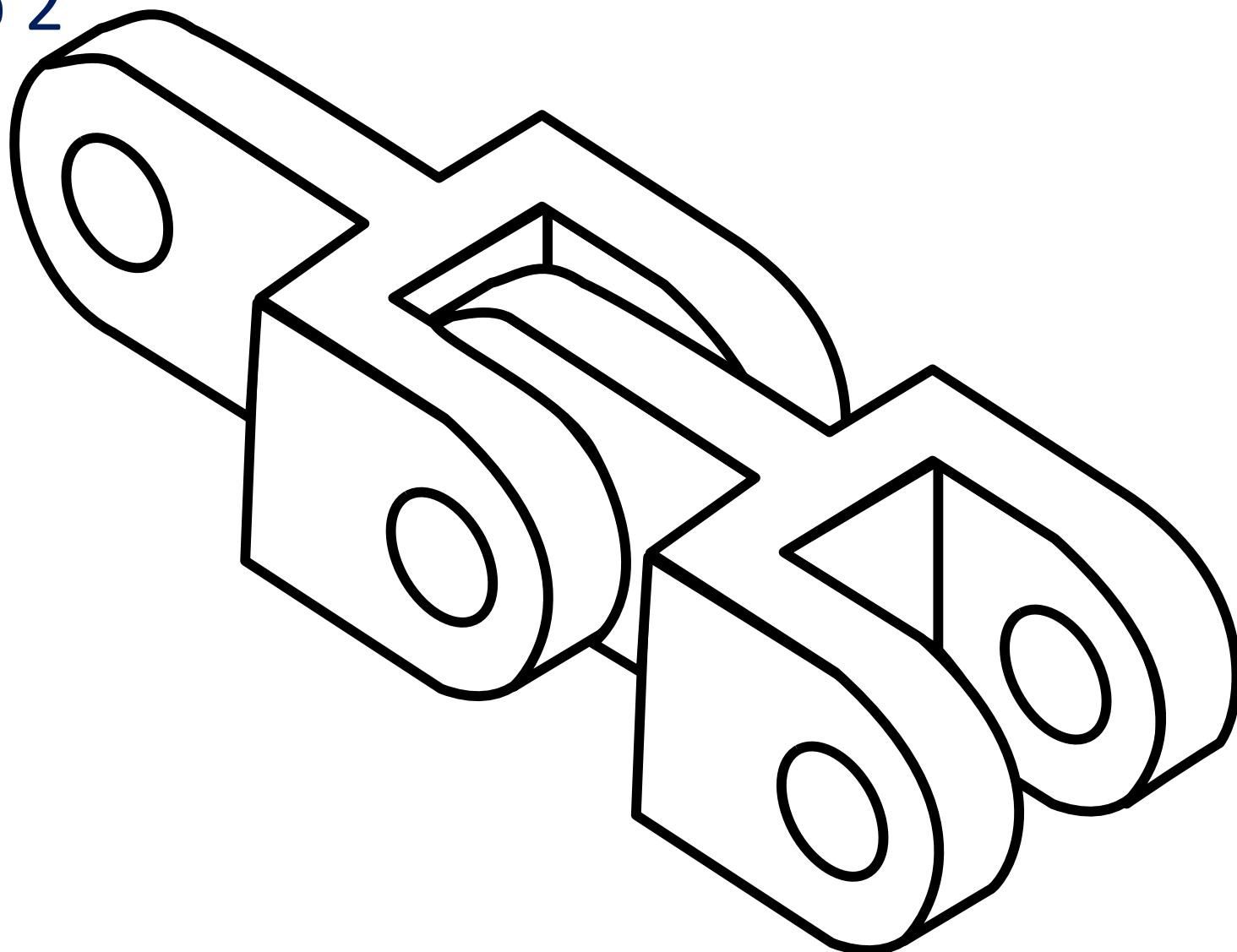
Sequence of Manufacture

- Step 1



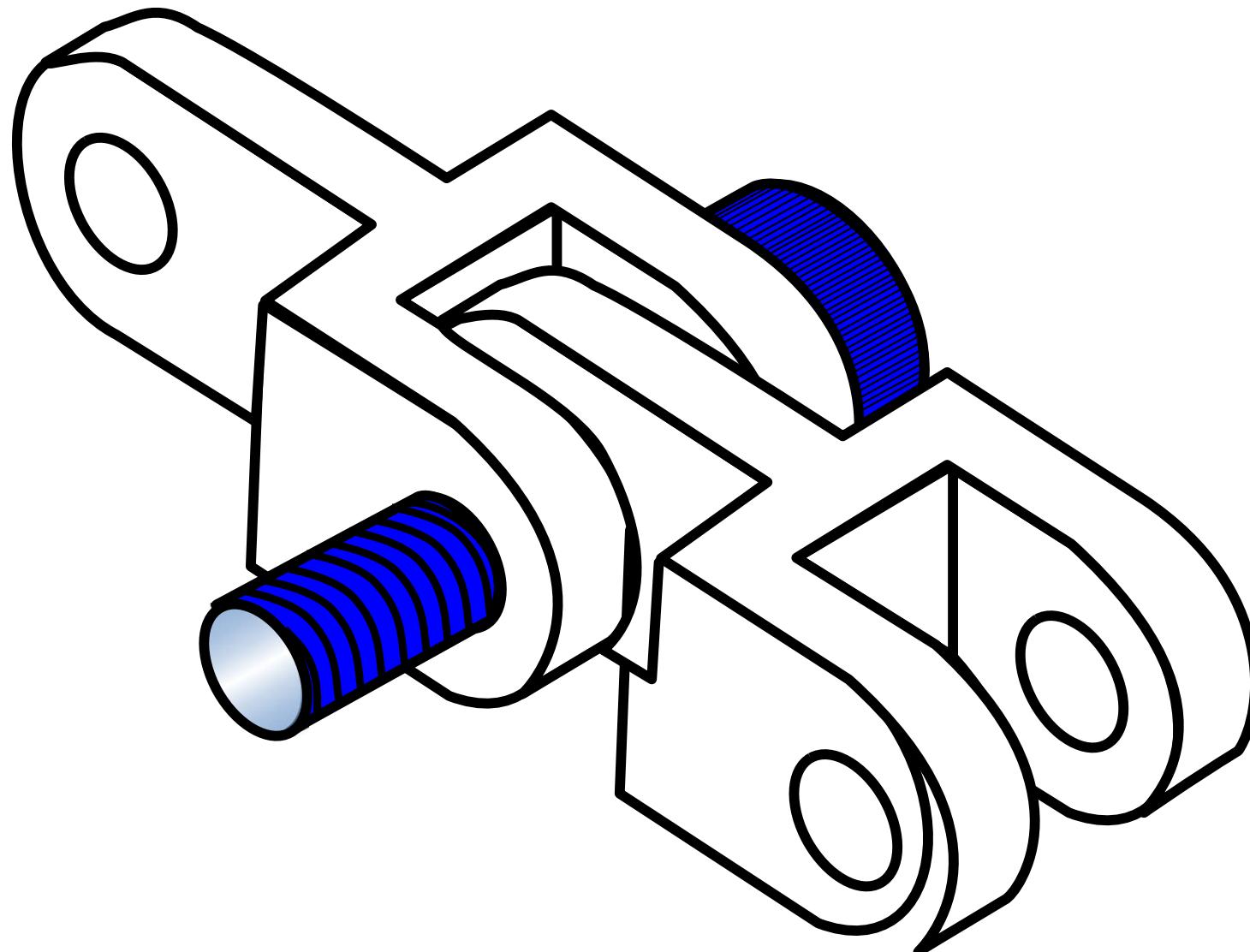
Sequence of Manufacture

- Step 2



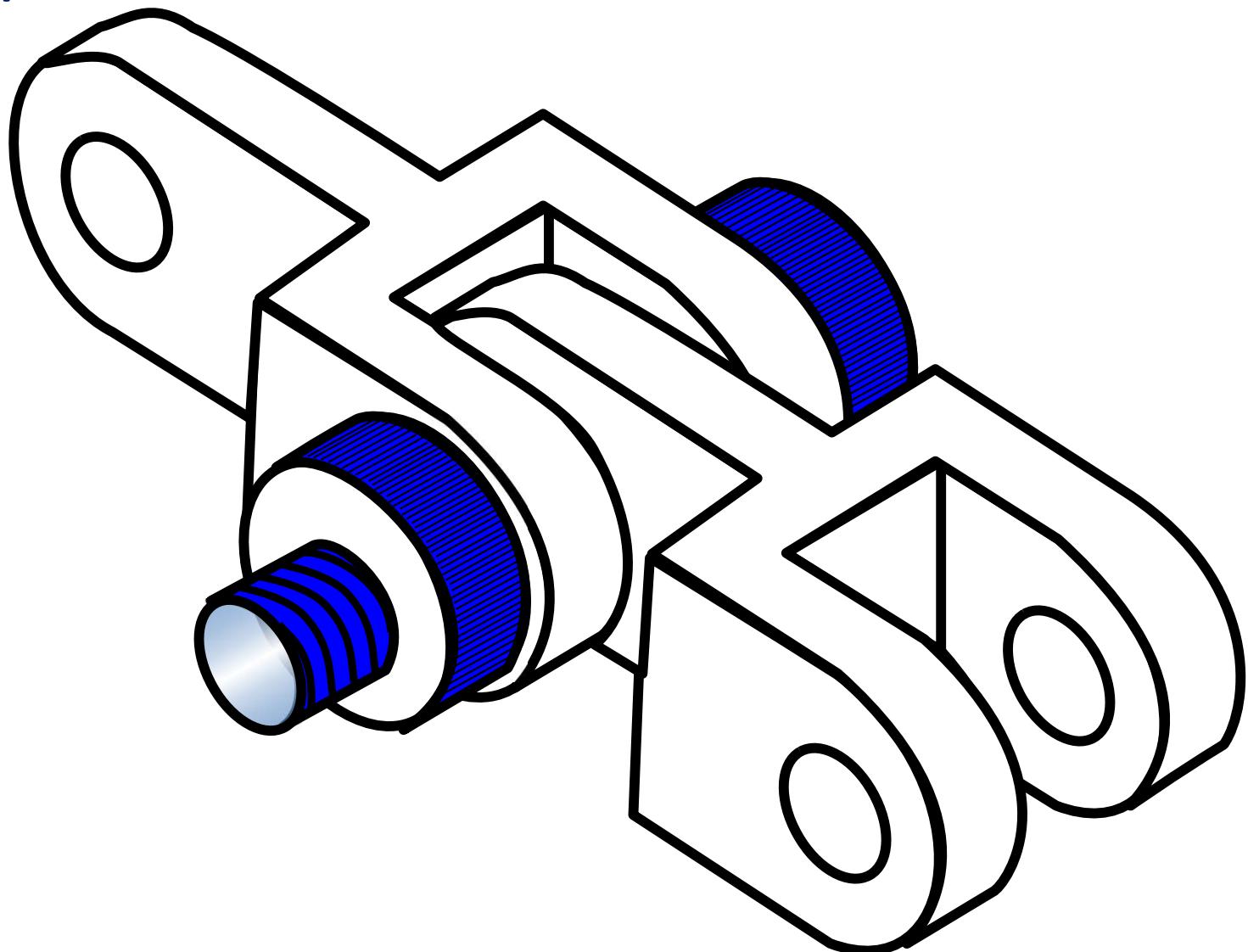
Sequence of manufacture

- Step 3



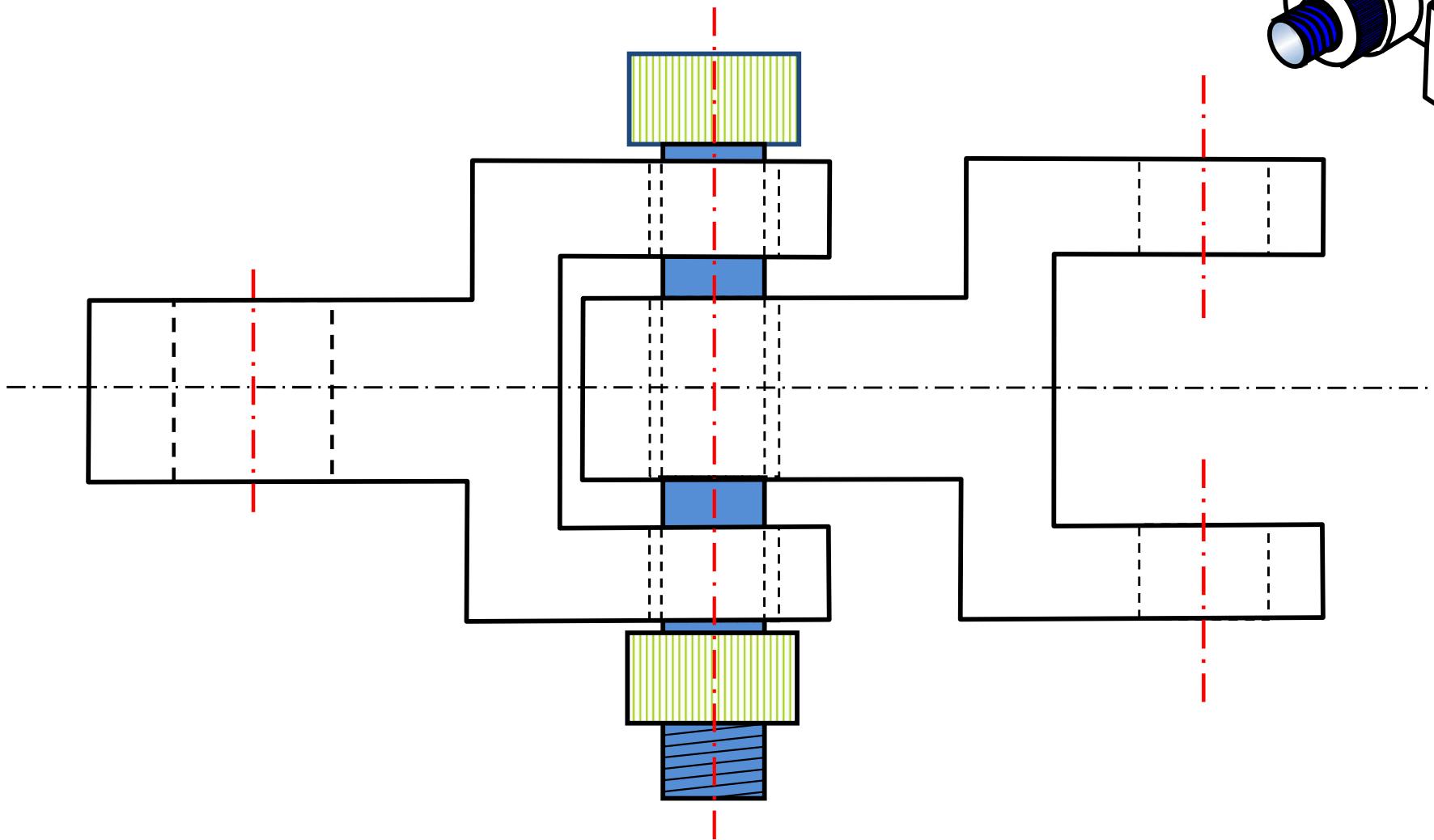
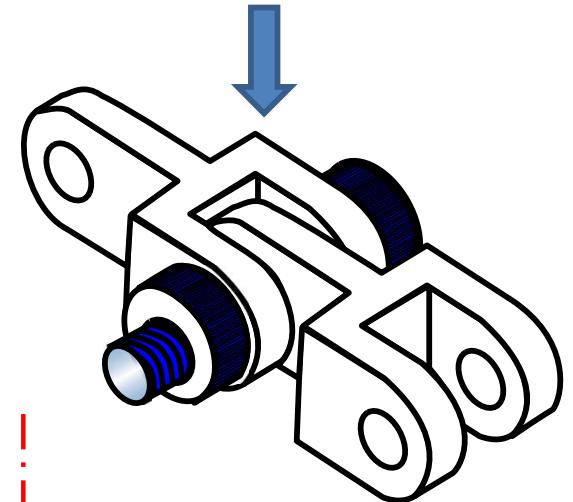
Sequence of manufacture

- Step 4



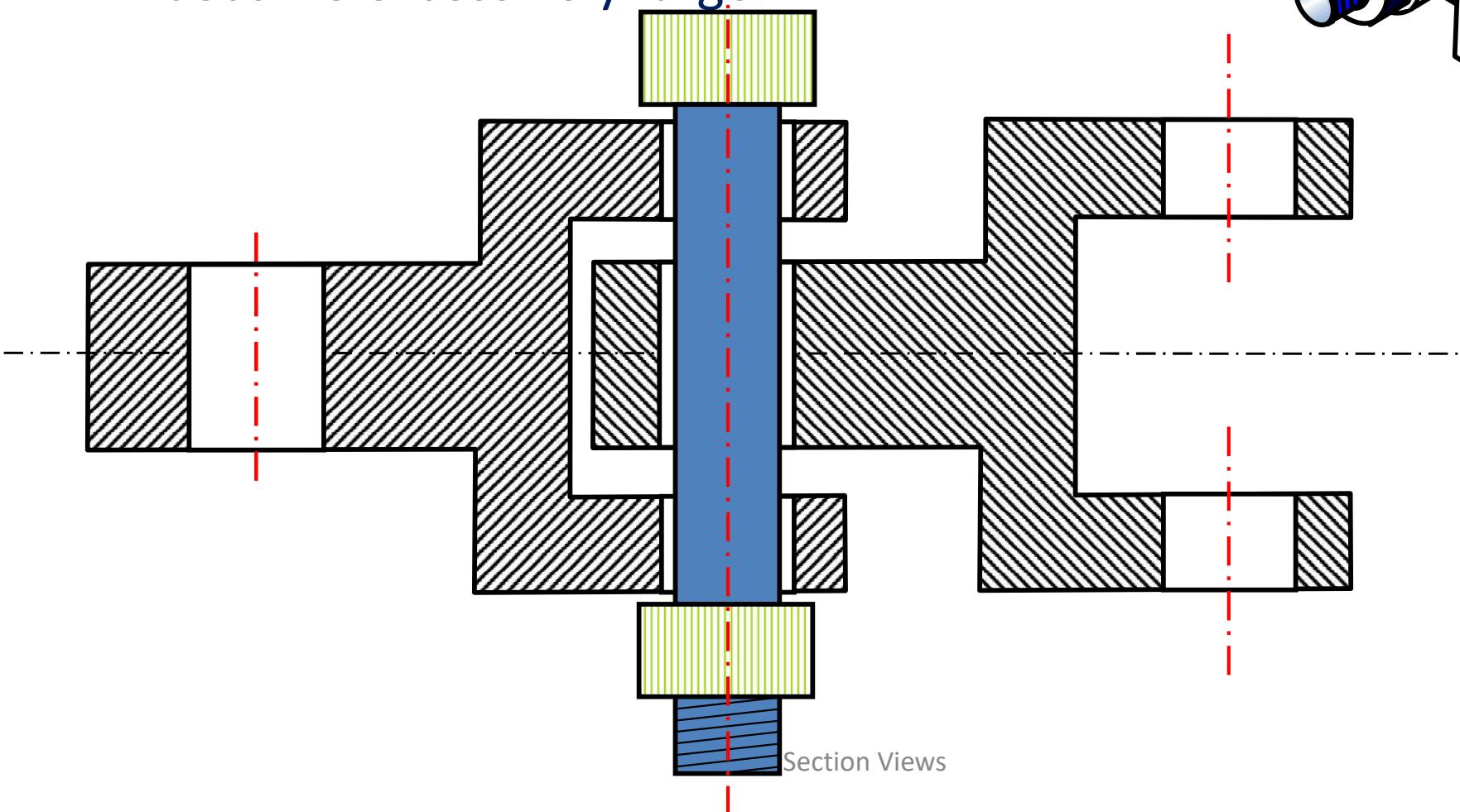
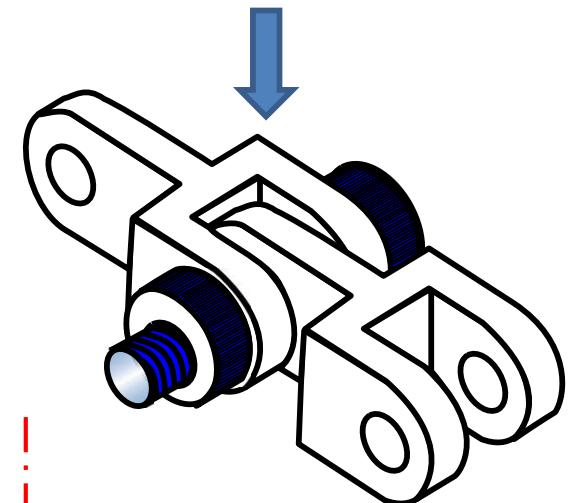
About Assembly Sections?

- Top view-too many hidden lines
- Not clear



Why Assembly Sections?

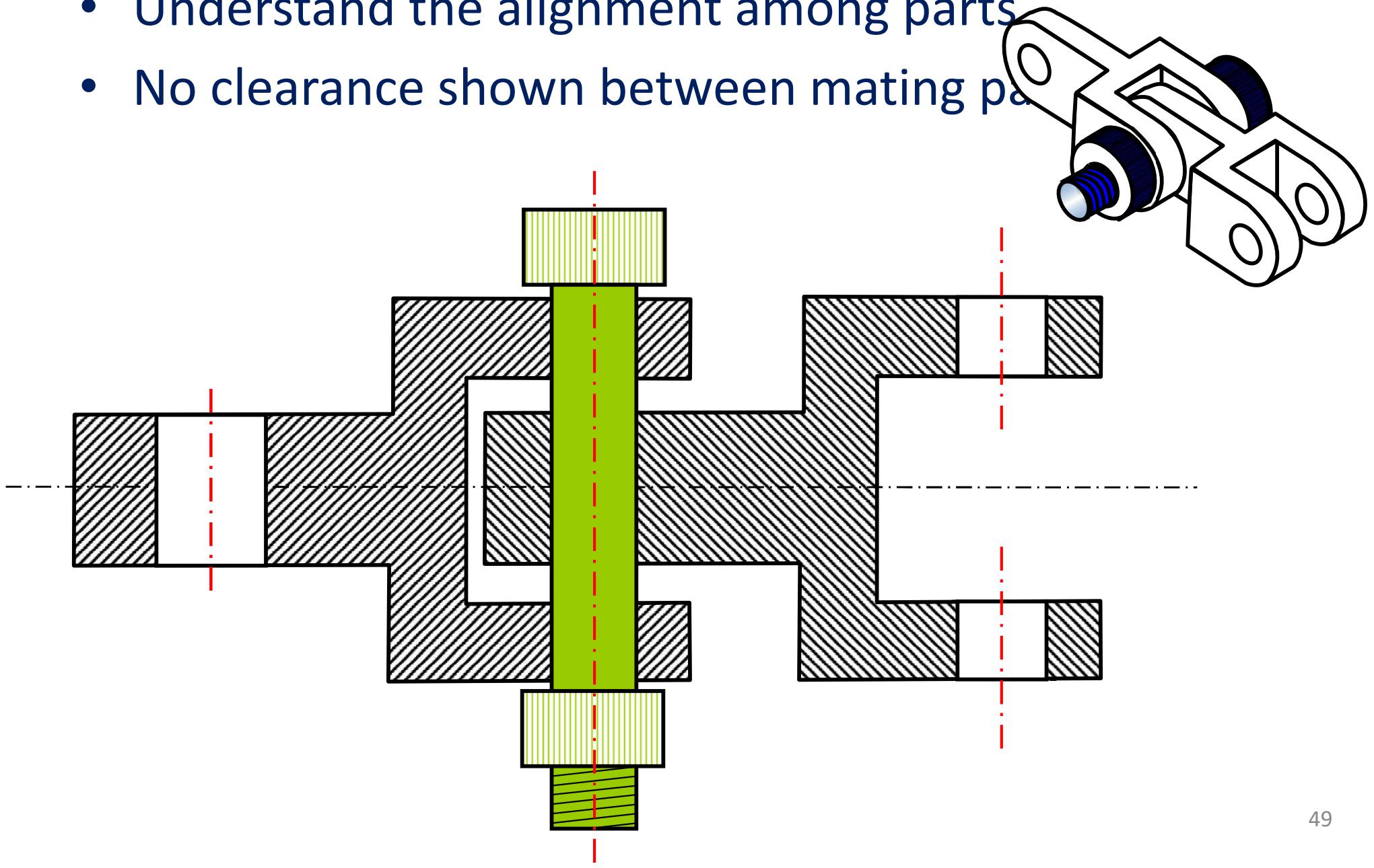
- Help understand how parts fit together.
- Clearances between mating parts is usually not shown-otherwise the drawing size may become excessively large.



Section Views

Important Points

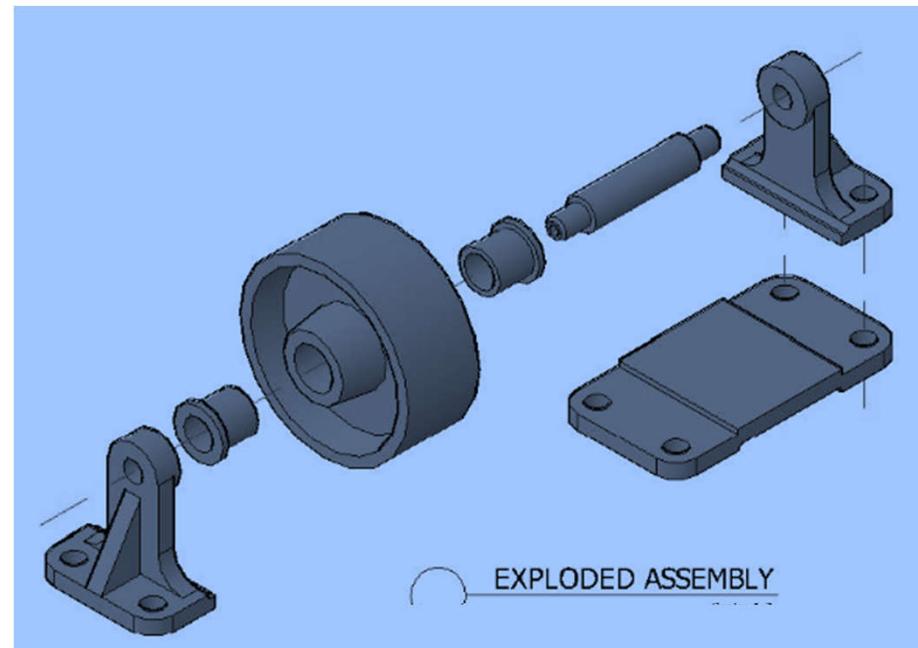
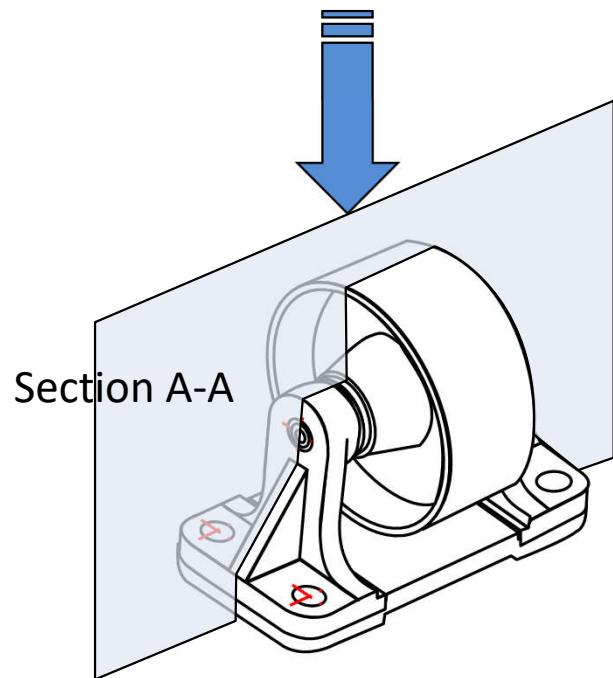
- Understand the alignment among parts
- No clearance shown between mating pa



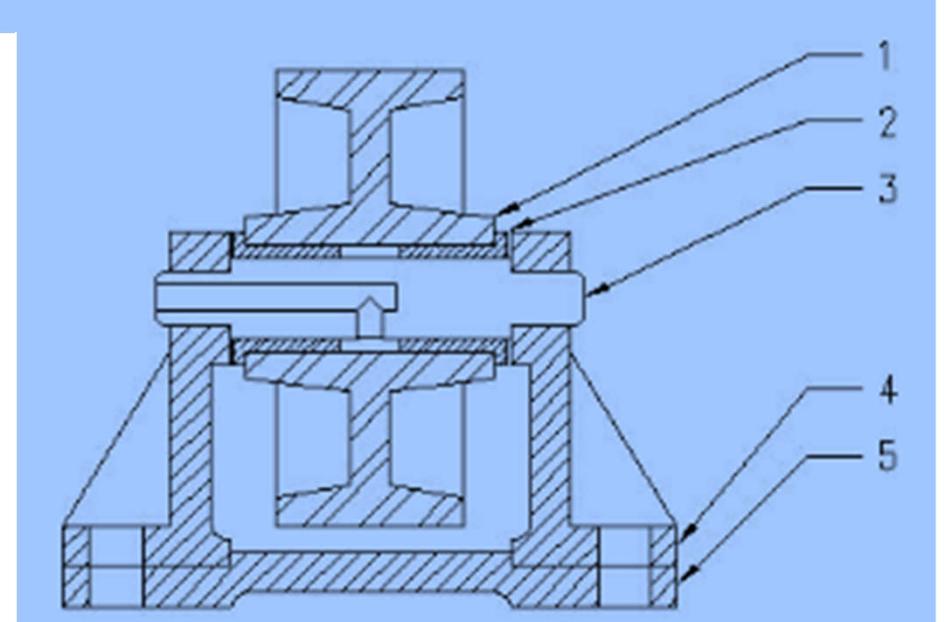
Important Points for Assembly Drawings

- Bring out the functional aspects of the assembly.
- Section should reveal key functionality.
- Clearance between mating parts is not shown.
 - Otherwise the drawing size may become very large.
- Decide the number of views required.
- Identify only the major dimensions.
 - Do not repeat part level dimensions.
- Avoid hidden lines.

Example-Belt Roller Support



Section A-A





Thank You