

ENGINEERING DRAWING

SKV 1021

SECTIONS

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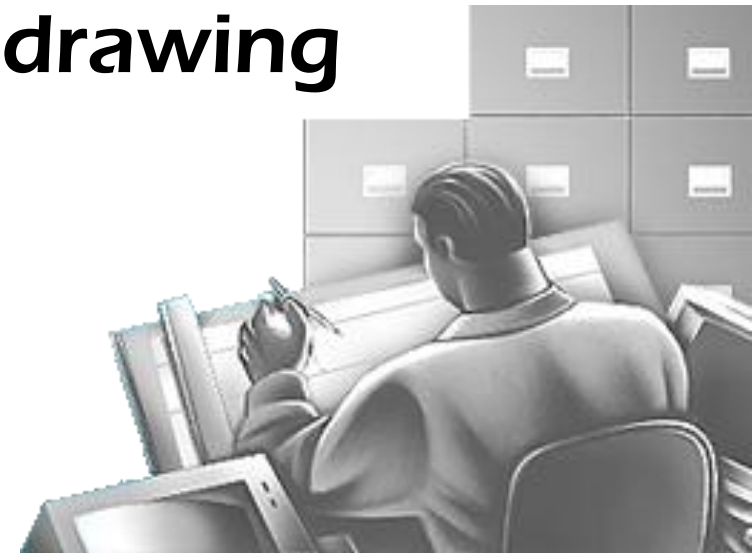


LEARNING OUTCOMES

SECTIONS

It is expected that students will be able to:

- **Identify the symbols and position the cutting plane/sections**
- **Apply the technique for drawing sections**



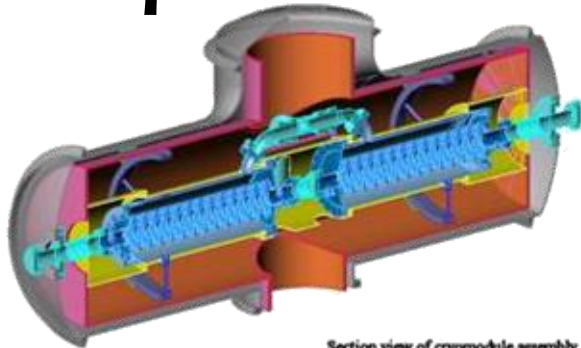
SECTIONS

- **INTRODUCTION AND APPLICATIONS**
- **SYMBOLS AND POSITIONING OF CUTTING PLANE OR SECTION**
- **TYPES OF CROSS SECTION**
- **TECHNIQUES FOR DRAWING SECTIONS**
- **CONVENTIONS USED IN SECTION DRAWING**



INTRODUCTION AND APPLICATION

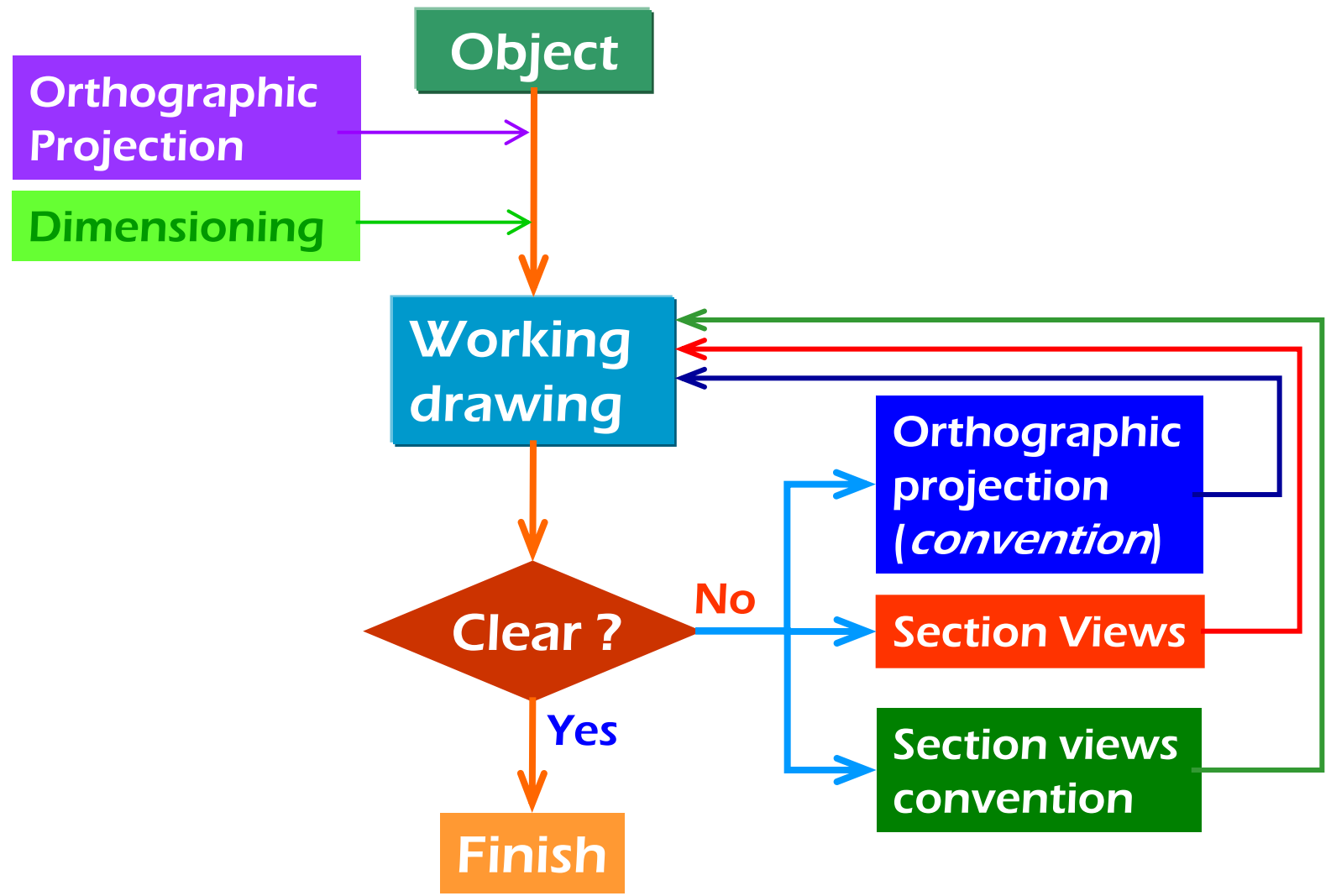
- **Section drawing is a continuation of the orthographic and isometric drawing**
- **Used to reduce the confusion of complicated shape of objects.**
- **It shows clearly the details about the shape of the objects.**



Section view of cryomodule assembly.



GRAPHICS COMMUNICATION WITH ENGINEERING DRAWING

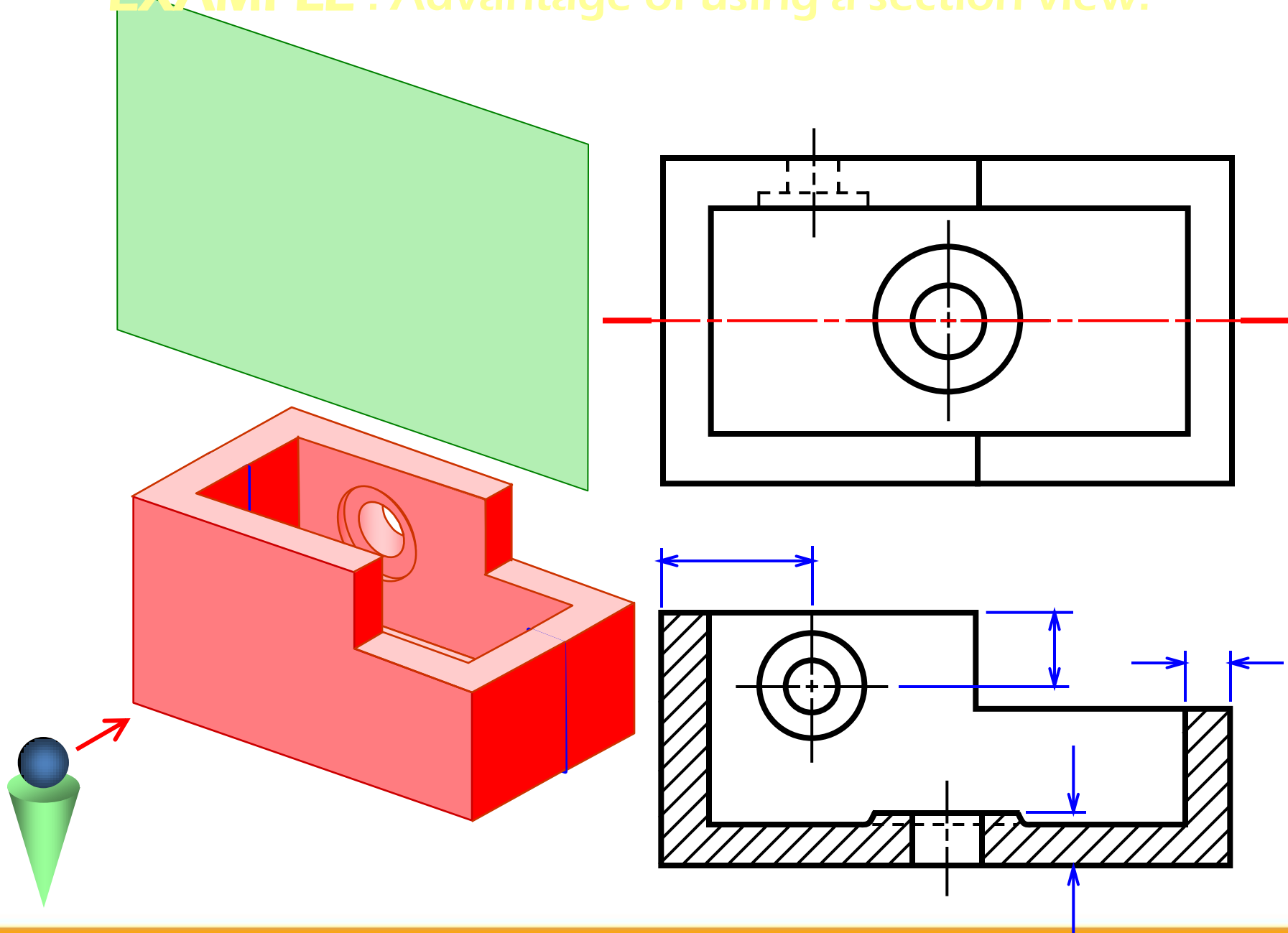


PURPOSES OF SECTION VIEWS

- **Clarify the views by**
 - ❖ **reducing or eliminating the hidden lines.**
 - ❖ **revealing the cross sectional's shape.**
- **Facilitate the dimensioning.**

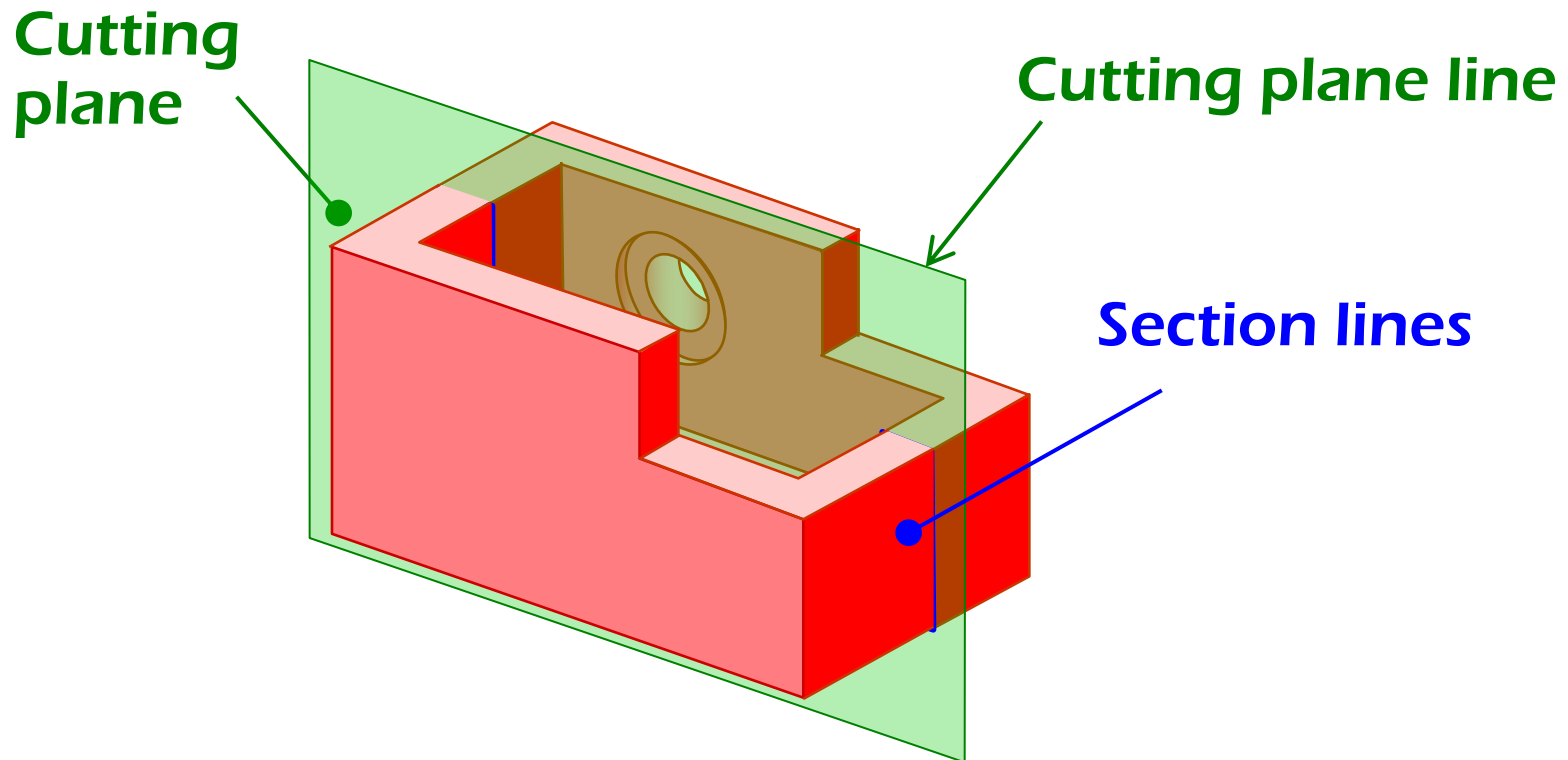
Let see the example

EXAMPLE : Advantage of using a section view.

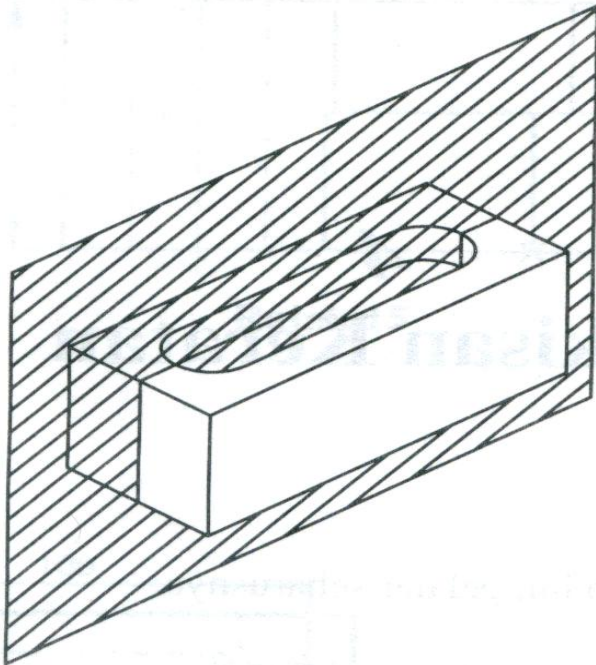


CUTTING PLANE

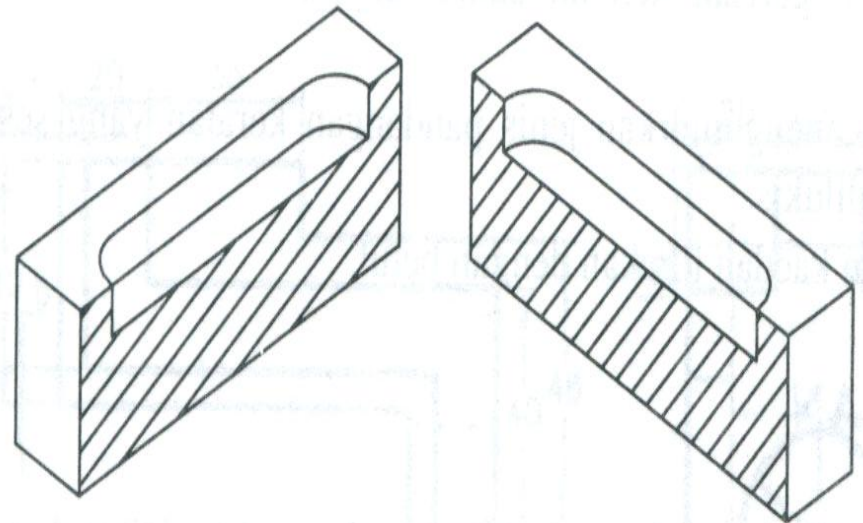
Cutting plane is a plane that ***imaginarily cuts*** the object to reveal the internal features.



CUTTING PLANE (cont'd)

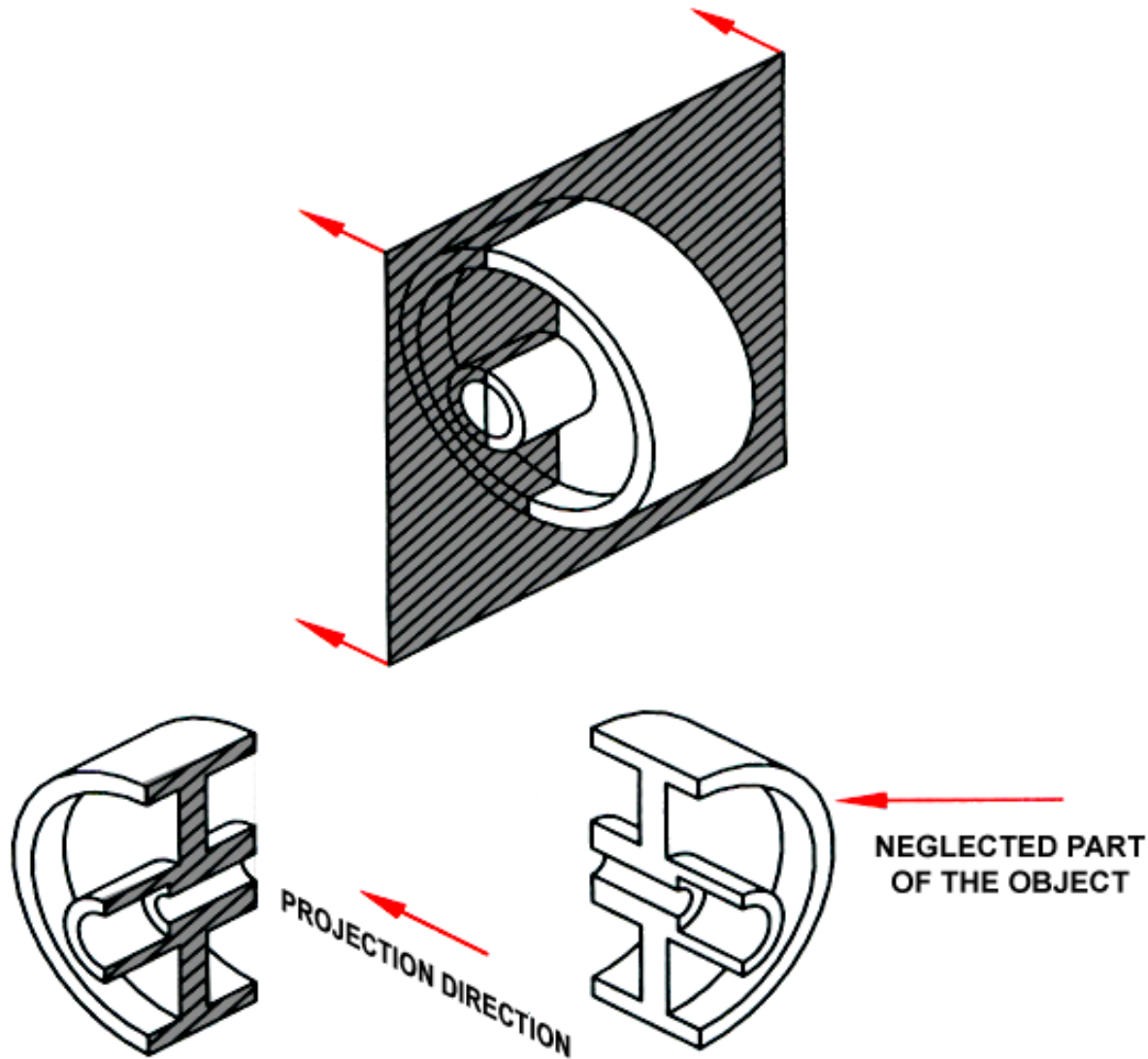


An object with cutting plane



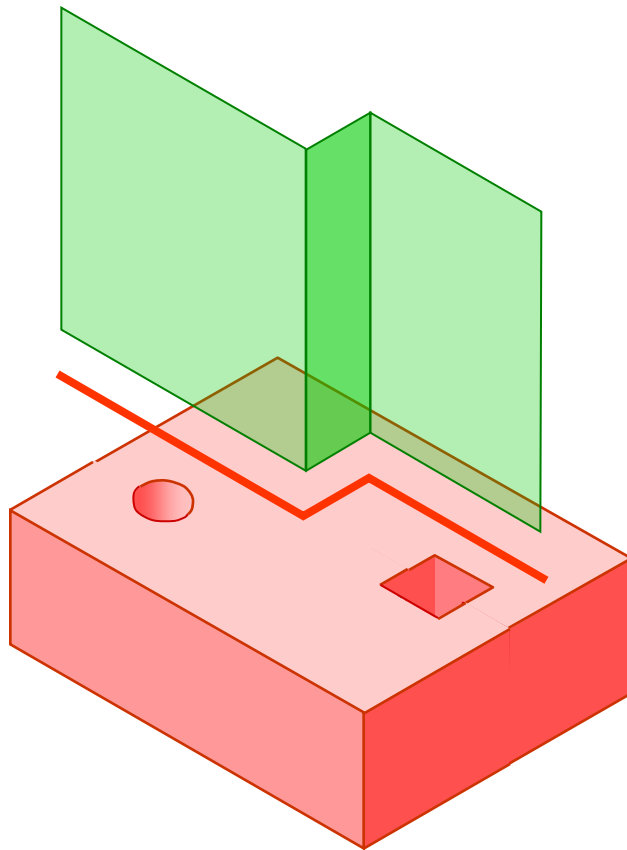
The result of the cutting

CUTTING PLANE (cont'd)

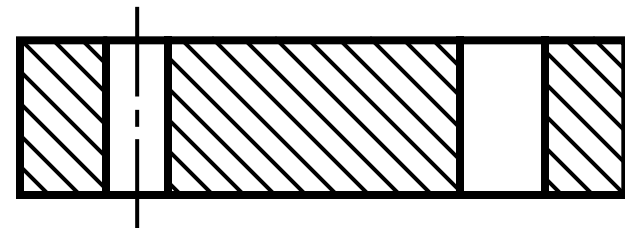
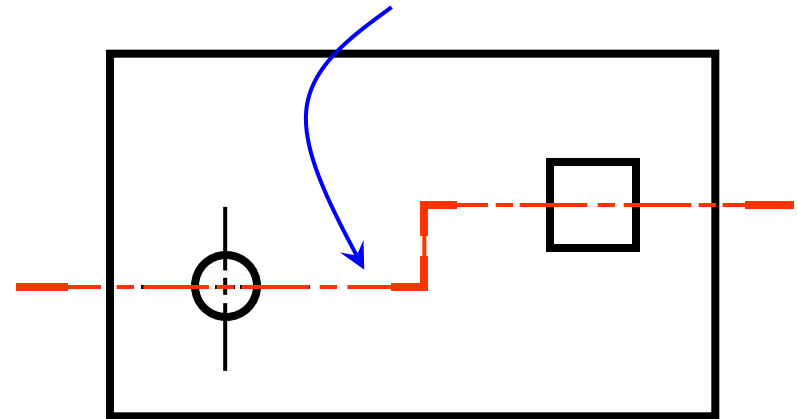


CUTTING PLANE LINE

Cutting plane line is an *edge view* of the cutting plane.



Indicate the *path* of cutting plane.



**ANSI
standard**



*Viewing
direction*



*Viewing
direction*



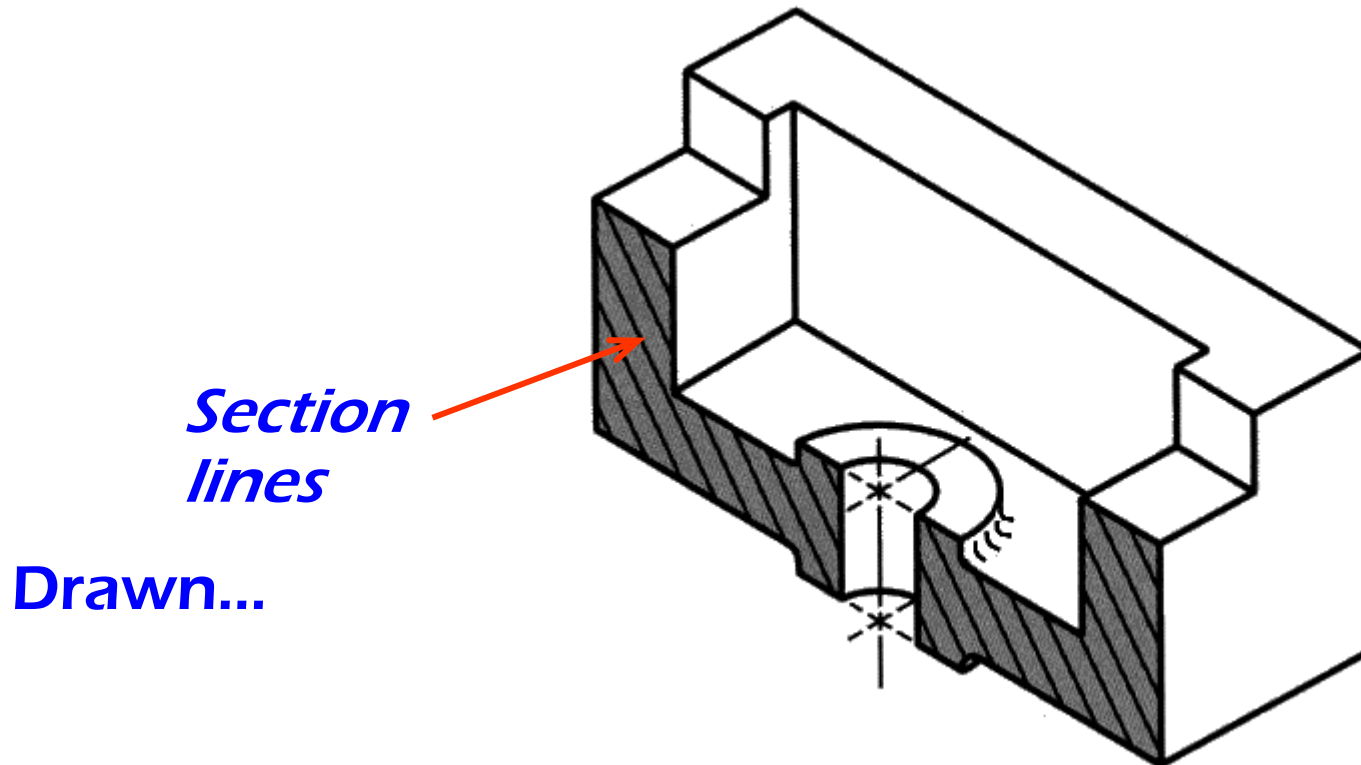
**JIS & ISO
standard**

This course

*Viewing
direction*

SECTION LINING

Section lines or *cross-hatch lines* are used to indicate the surfaces that are cut by the cutting plane.

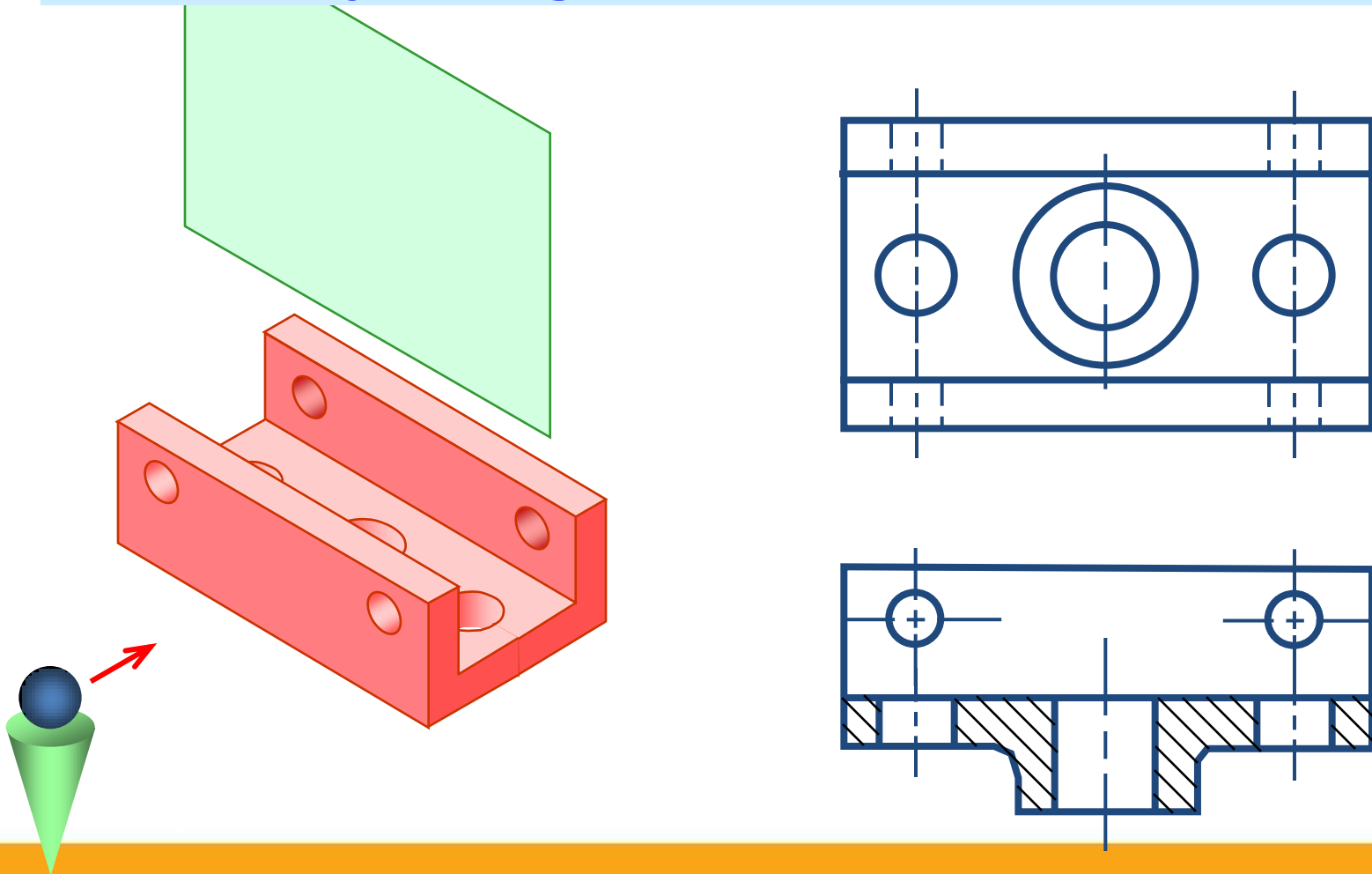


TYPES OF CROSS SECTION

- 1. Full section**
- 2. Offset section**
- 3. Half section**
- 4. Broken-out section**
- 5. Revolved section (aligned section)**
- 6. Removed section (detailed section)**

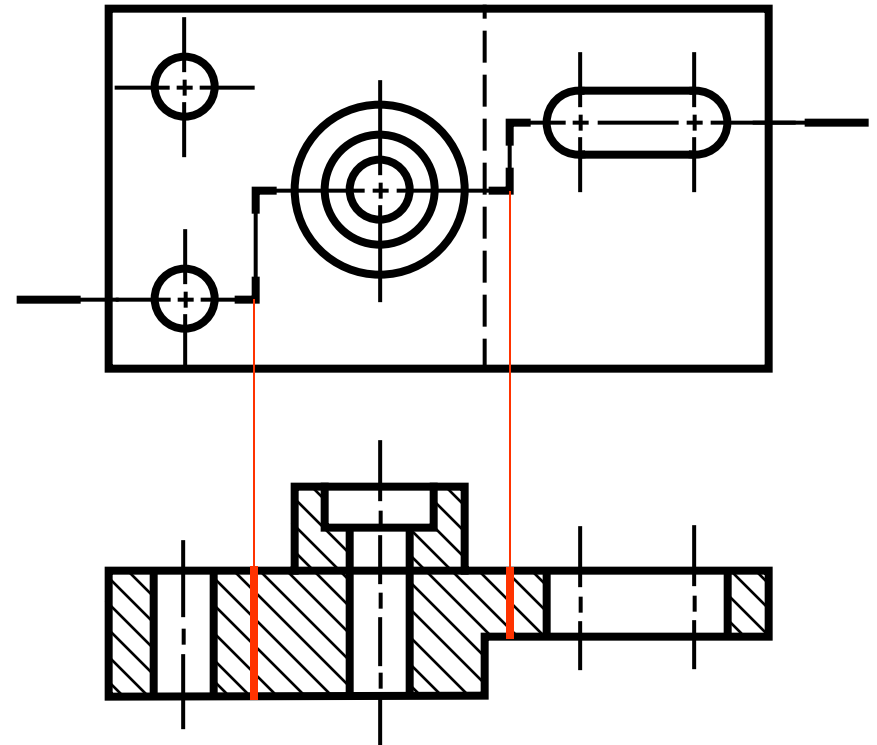
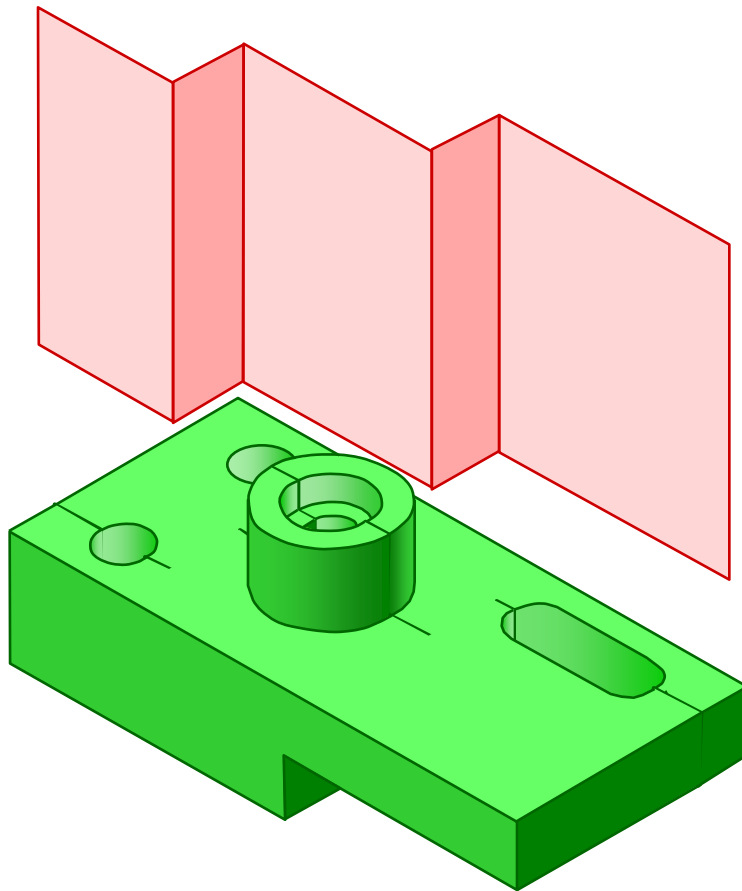
FULL SECTION VIEW

The view is made by passing the *straight* cutting plane *completely through* the part.

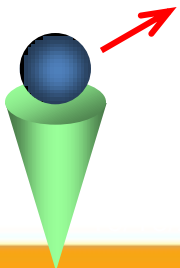


OFFSET SECTION VIEW

The view is made by passing the *bended* cutting plane *completely through* the part.

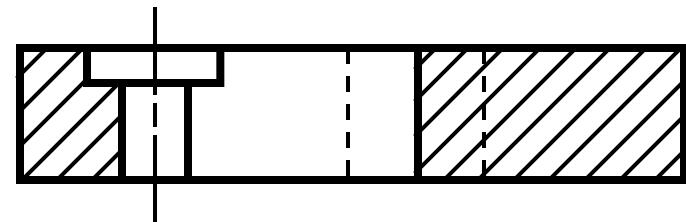
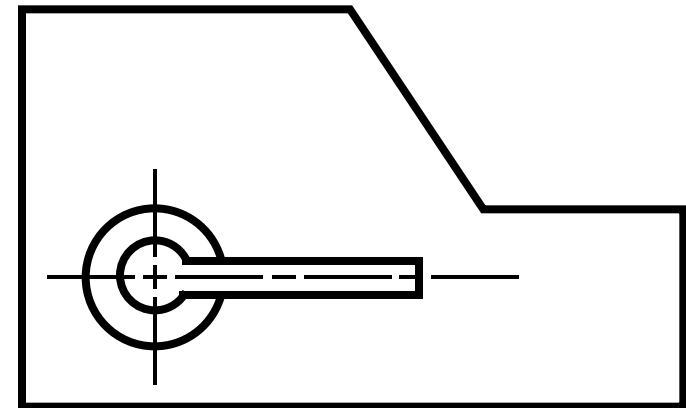
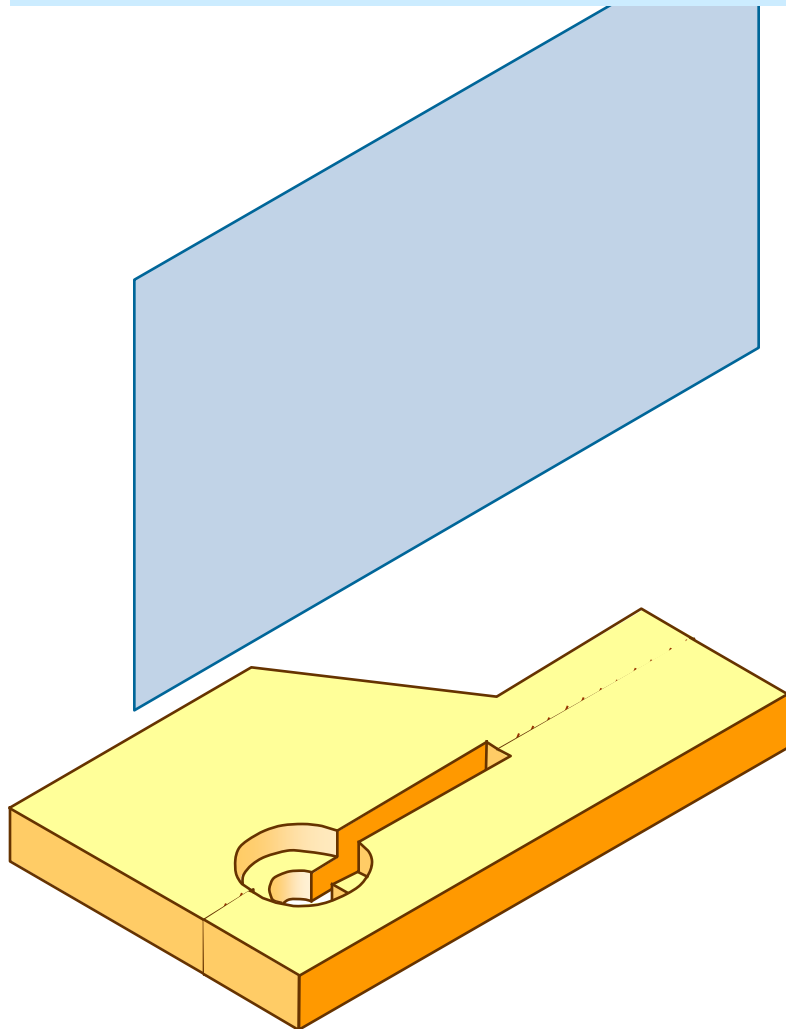


Do not show the edge views of the cutting plane.



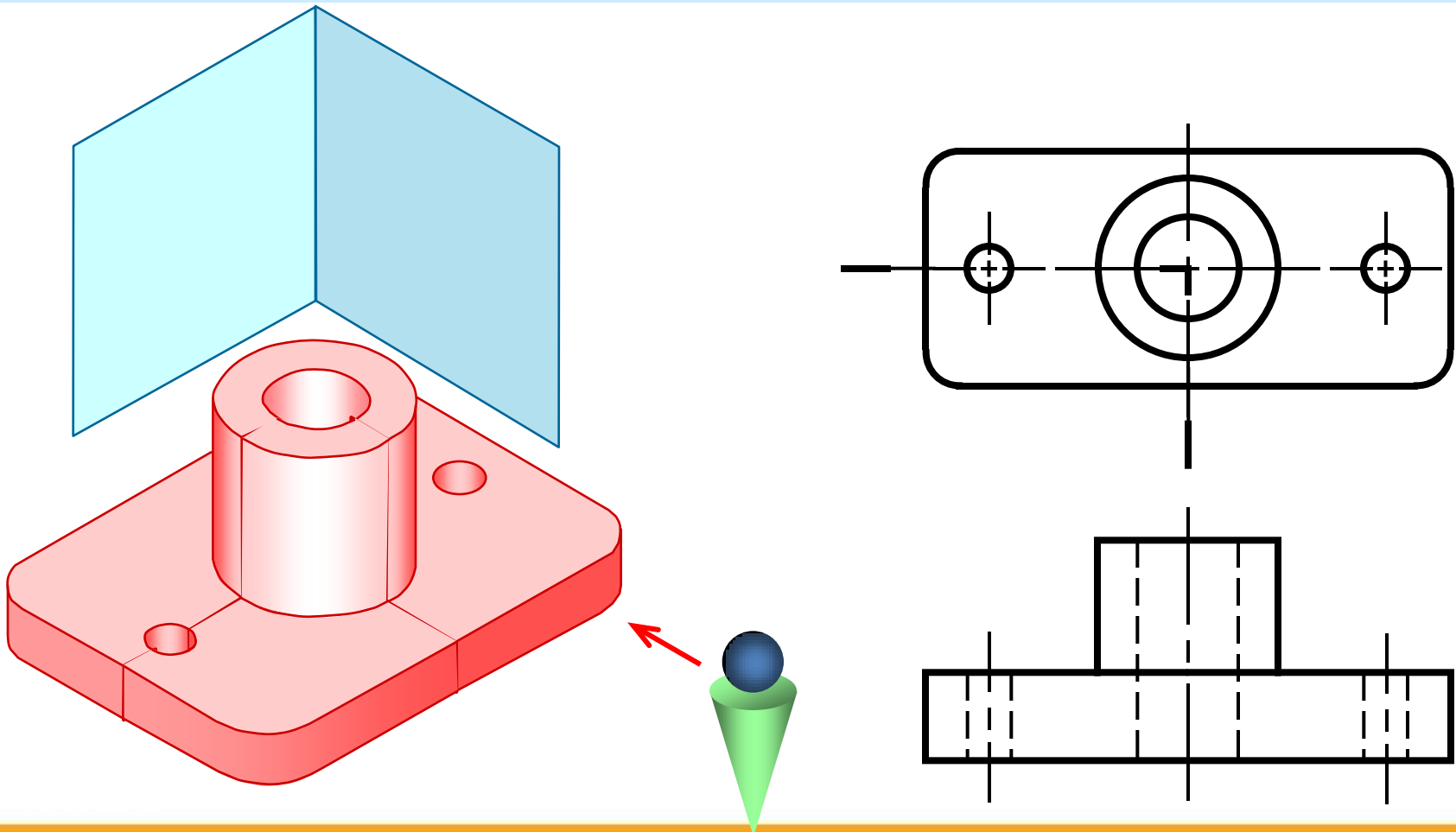
TREATMENT OF HIDDEN LINES

- Hidden lines are *normally omitted* from section views.



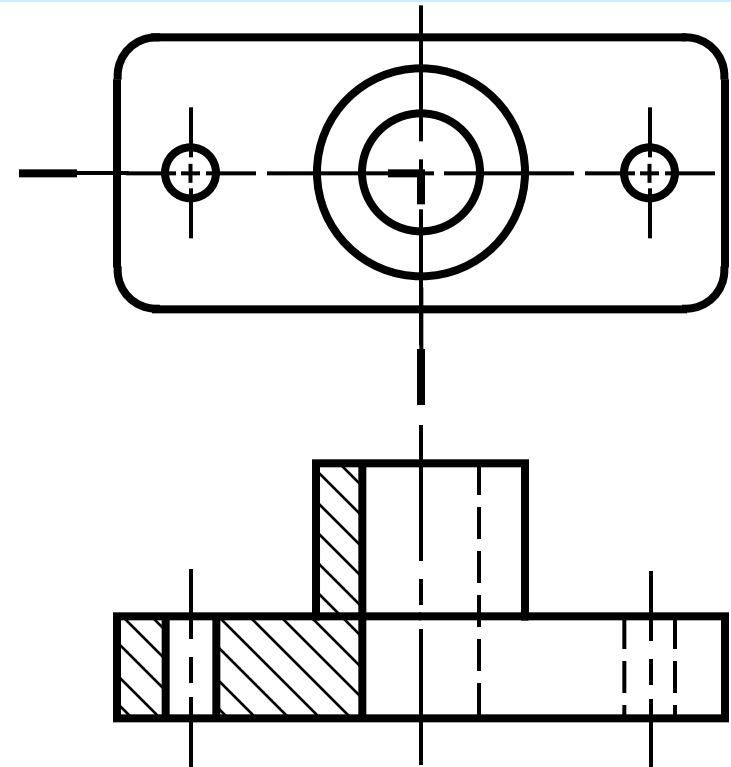
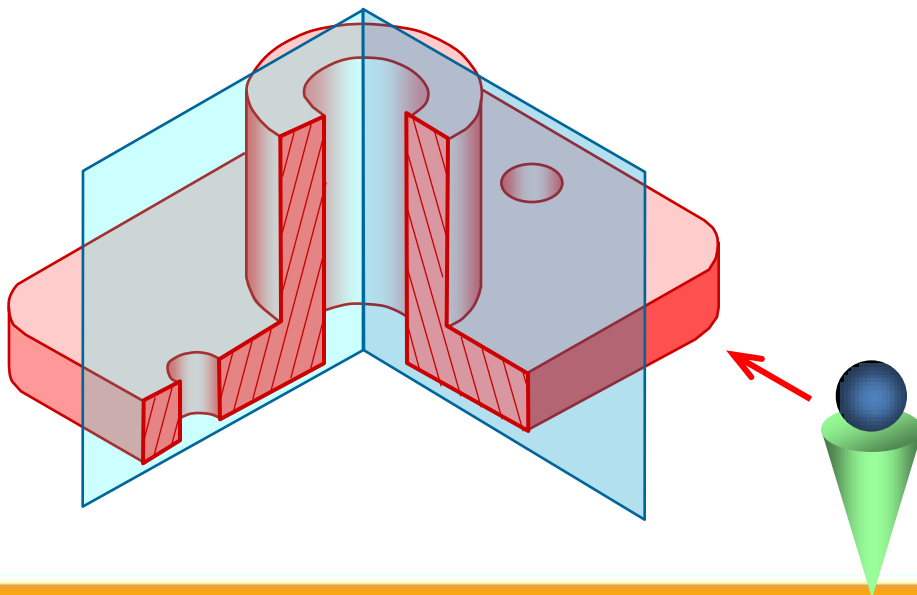
HALF SECTION VIEW

The view is made by passing the cutting plane *halfway* through an object and remove a *quarter* of it.



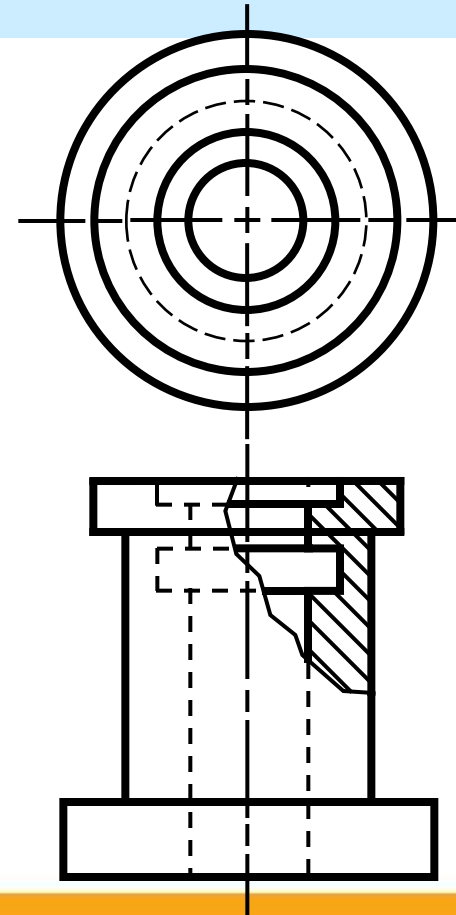
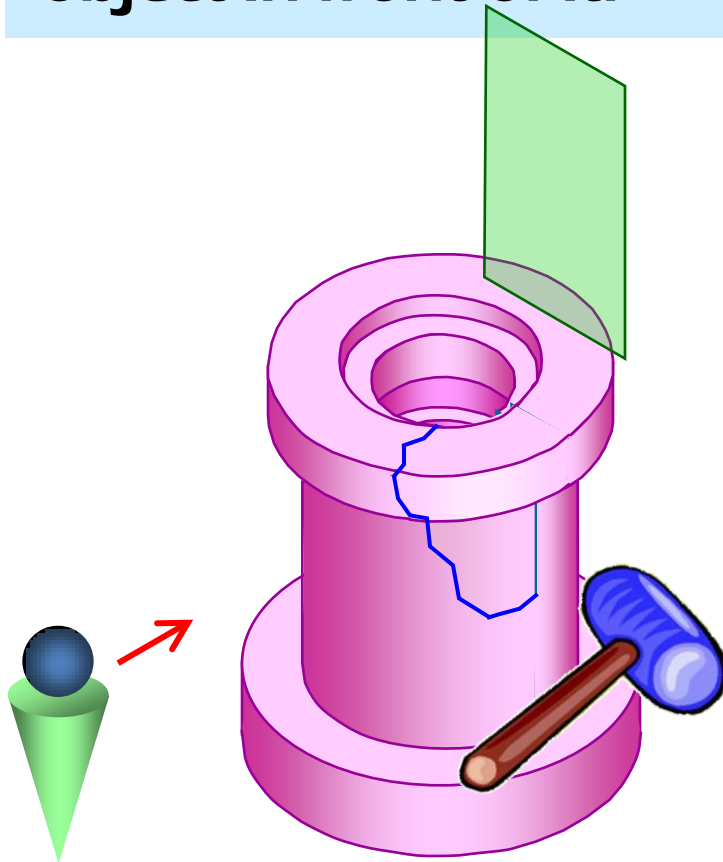
HALF SECTION VIEW

- A **center line** is used to separate the sectioned half from the unsectioned half of the view.
- **Hidden line** is omitted in unsection half of the view.

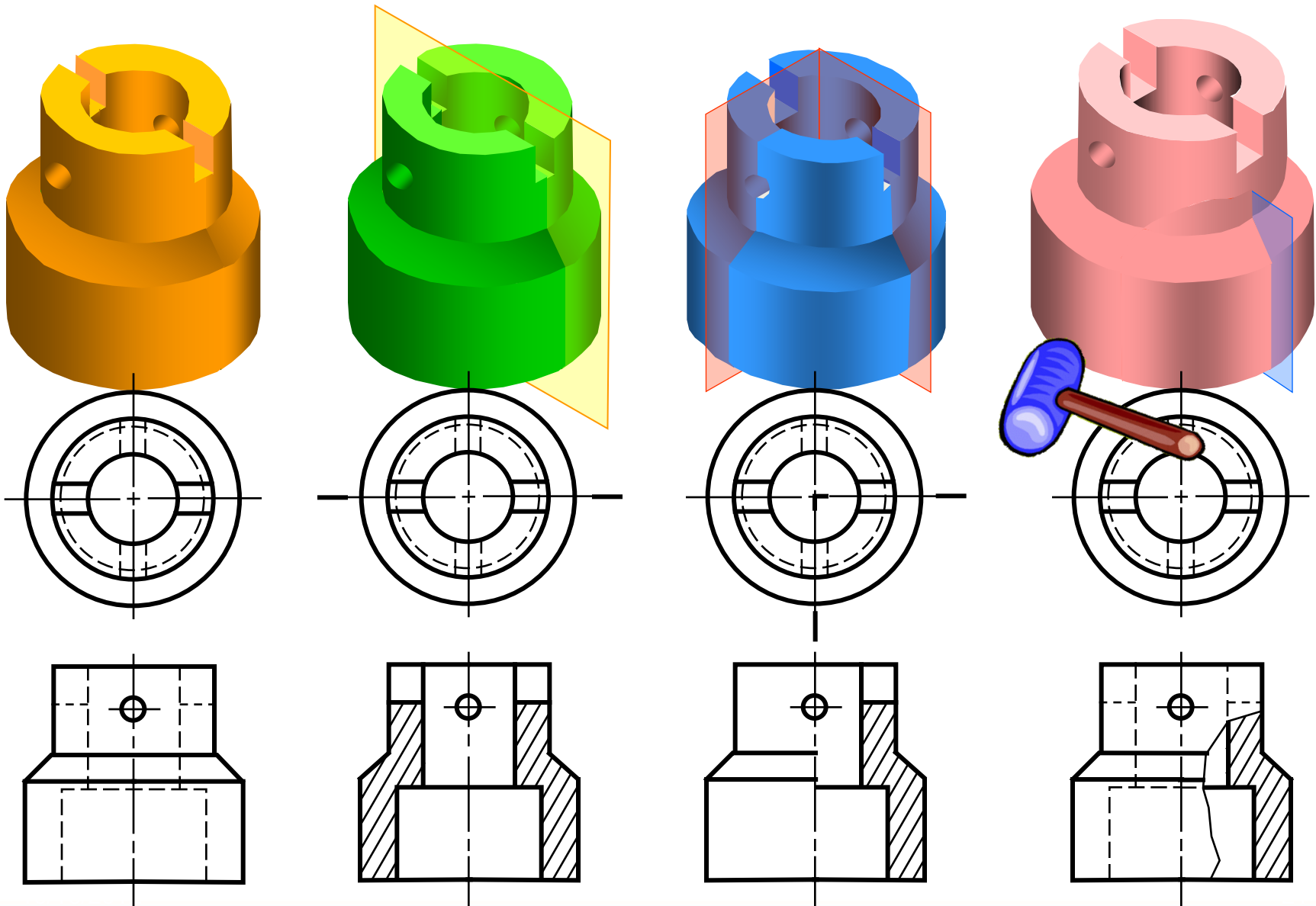


BROKEN-OUT SECTION VIEW

The view is made by passing the cutting plane normal to the viewing direction and removing the portion of an object in front of it.



EXAMPLE : Comparison among several section techniques



REVOLVED SECTION VIEW

- Revolved sections *show cross-sectional features* of a part.
- No need for additional orthographic views.
- This section is especially helpful when a cross-section varies.

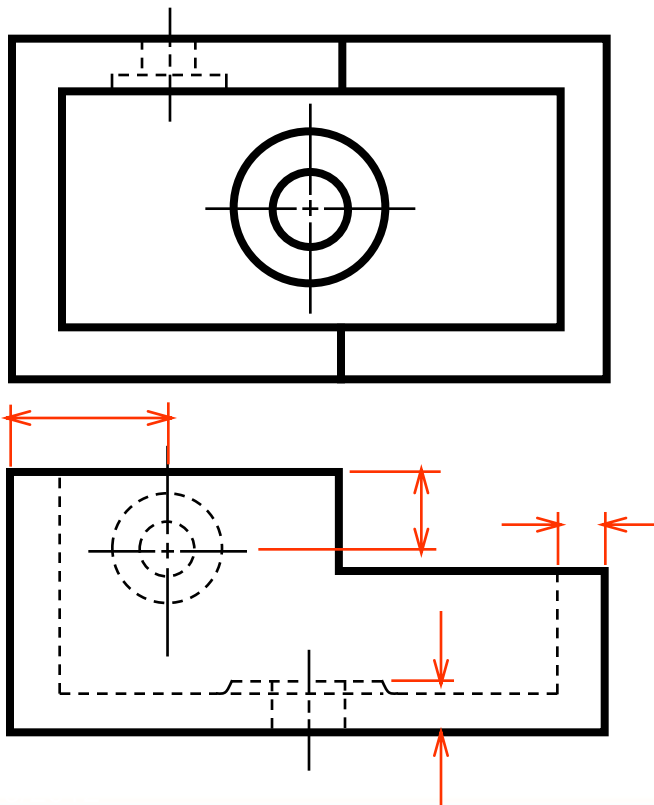
CONVENTIONS USED IN SECTION DRAWING

- **Key points you need to consider about the conventions**
 - ❑ Cutting lines and planes
 - ❑ Isometric and Orthographic drawing
 - ❑ Section lines or cross-hatch lines
 - ❑ Dimensioning
 - ❑ Hidden and visible lines

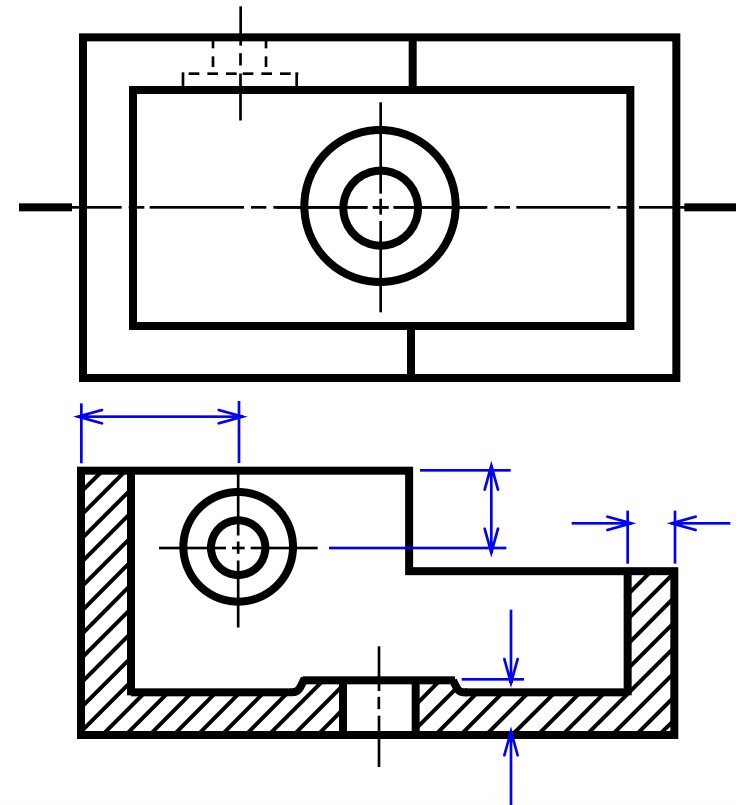
Dimensioning in Section View

- In most cases, dimensioning of the section views follows the typical rules of dimensioning.

POOR

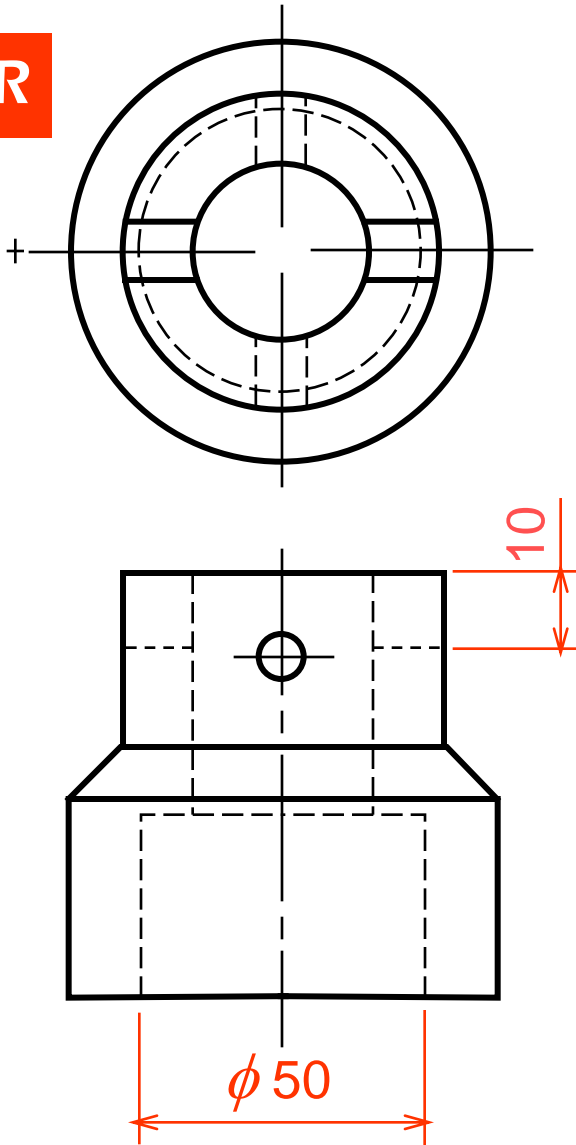


GOOD

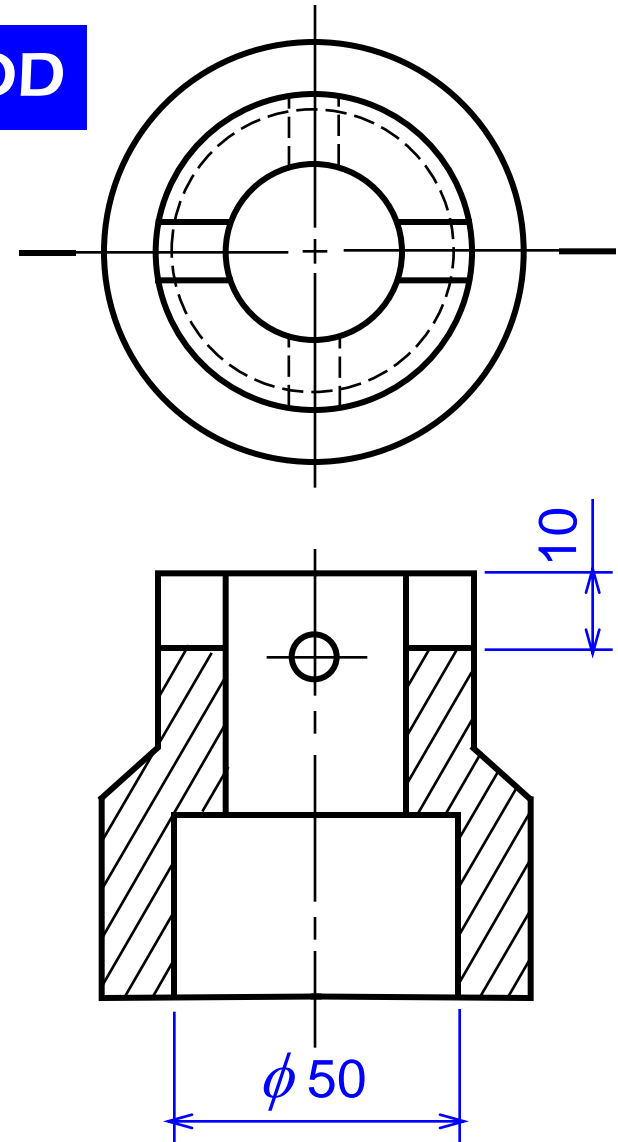


DIMENSIONING

POOR

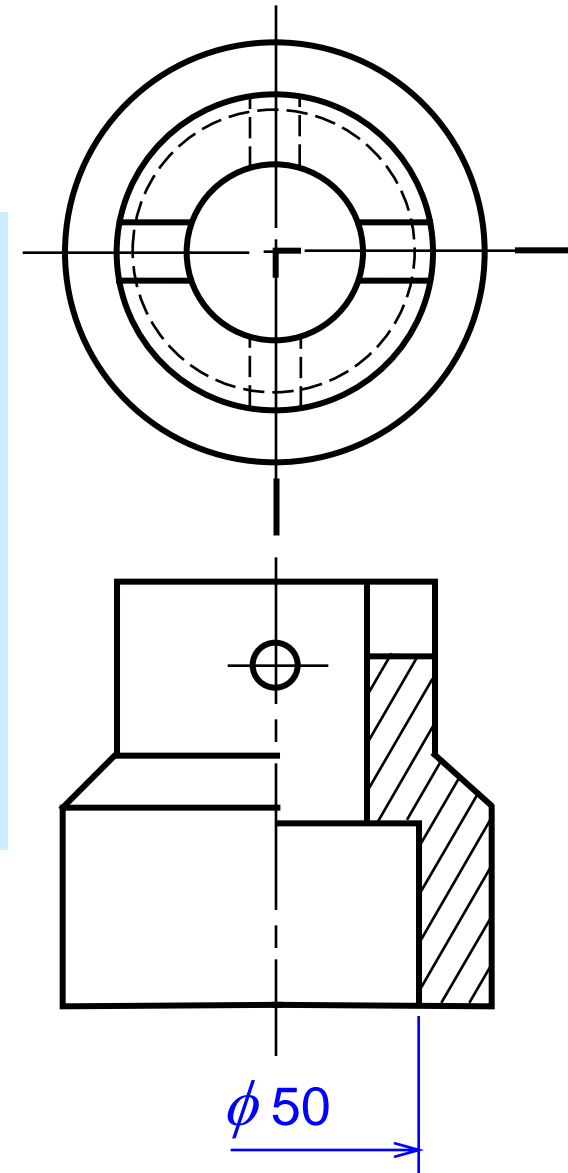


GOOD



DIMENSIONING

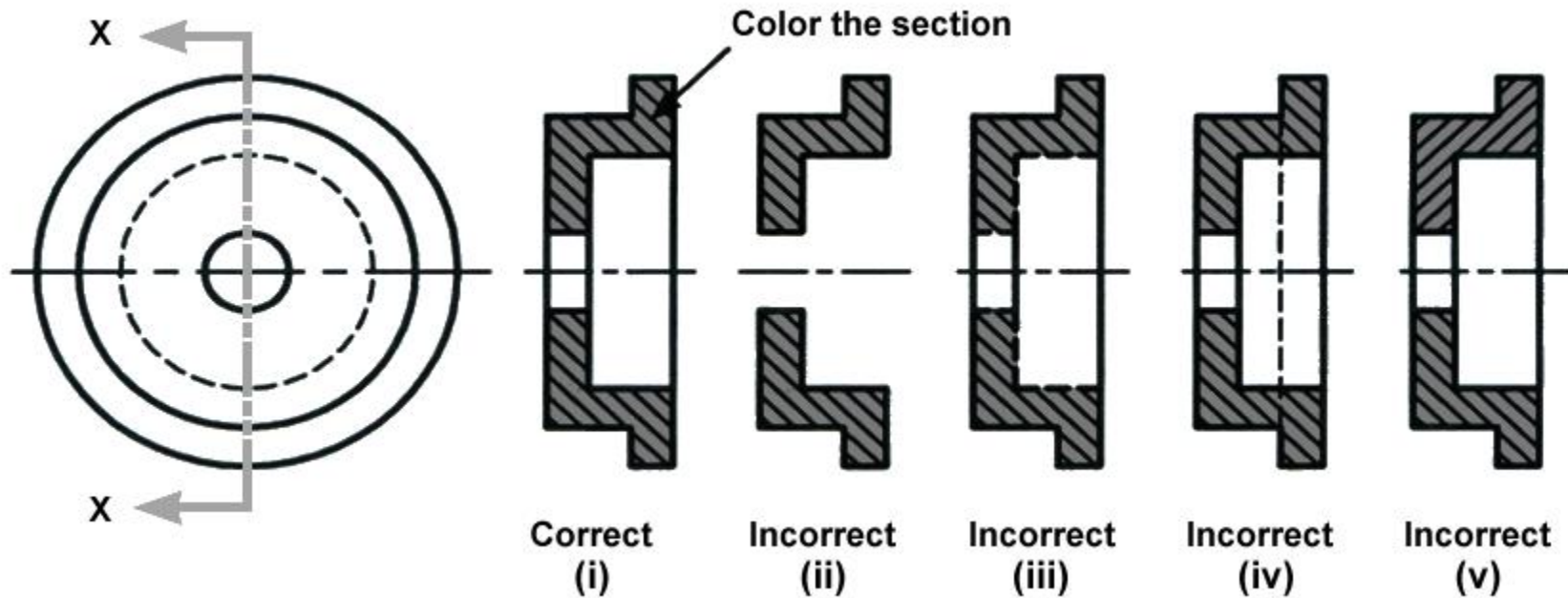
- For a half-section view, use dimension line with only one arrowhead that points to the position inside the sectioned portion.




COMMON MISTAKES ON THE CONSTRUCTION OF SECTION DRAWING

- (i) Correct section view, no mistakes**
- (ii) No continuation at the part of the object that has been cut**
- (iii) Hidden lines should not be used on the hatches**
- (iv) Hidden lines should not be used on the section view**
- (v) The direction of all hatches must be parallel (except for 2 separate objects)**

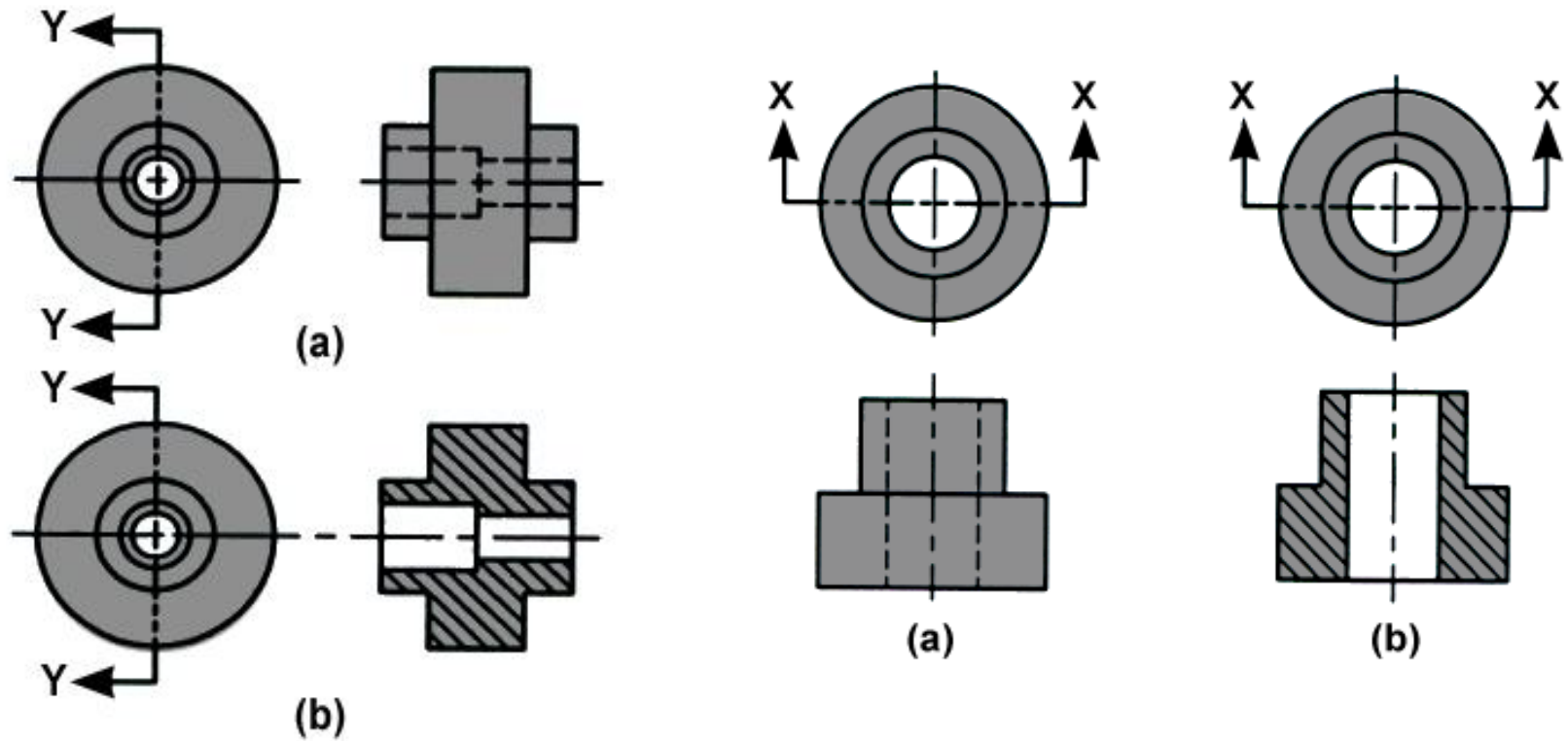
COMMON MISTAKES ON THE CONSTRUCTION OF SECTION DRAWING (cont'd)



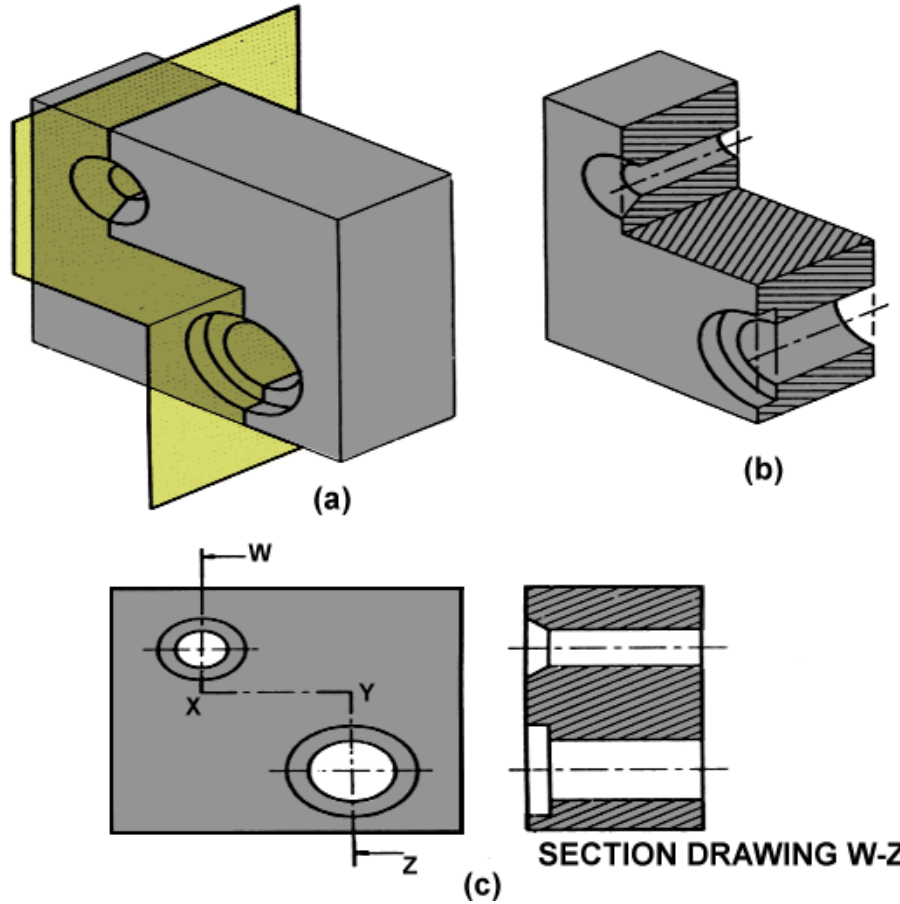
TECHNIQUES FOR DRAWING SECTIONS

- Using the same method as the orthographic and the isometric drawing.
- Drawn according to the cutting plane given.
- Hidden lines are omitted in the section view/drawing. (become visible lines)
- The usage of section lines or cross-hatch lines to indicate the surfaces that are cut by the cutting plane. (using *create hatchings* function  in QCAD, **use pattern 135 and thickness 1.0**)

EXAMPLES OF SECTION DRAWING



EXAMPLES OF SECTION DRAWING (cont'd)



**END
OF
COURSE**



CONCLUSION

1

Think about
what you
have learnt
from this
subject

2

Discuss
with your
friends
about this

3

Tell in front
of your
friends