

TECHNICAL DRAWING

Chapter VII : Sectioning

Cutting Plane – Full – Half – Offset – Special Cases

Mr. ZENNADI Karim

ENP

May 20, 2026

- ① Understanding Sectional Views
 - The Cutting-Plane Line
 - Sections Through Assembled Pieces
- ② Types of Sectional Views
 - Full Sections
 - Offset Sections
 - Half Sections
 - Broken-Out Sections
 - Revolved Sections
 - Auxiliary Sections
 - Removed Sections
 - Phantom Sections
- ③ Special Cases
 - Ribs and Webs in Section
 - Hidden and Visible Lines
 - Parts Not Sectioned
- ④ Practice Example

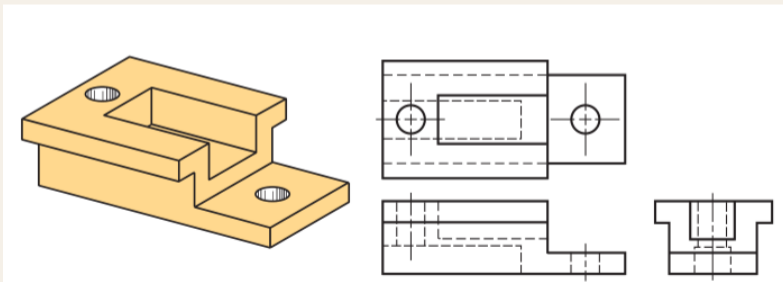
Section 1

Understanding Sectional Views

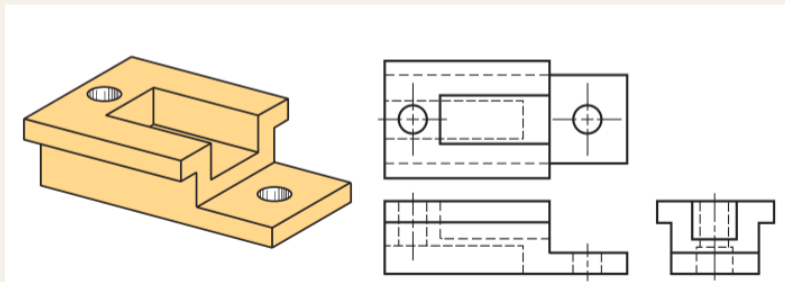
- 1 The Cutting-Plane Line
Sections Through Assembled Pieces
- 2 Types of Sectional Views
- 3 Special Cases
- 4 Practice Example

1

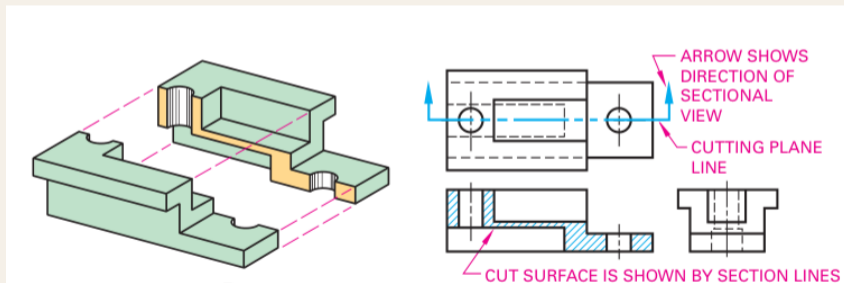
- ▶ Technical drawings must show all parts of an object, including the insides and other parts not easily seen.



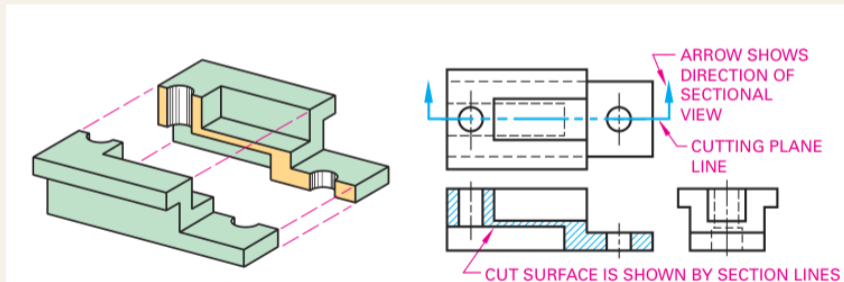
- ▶ Technical drawings must show all parts of an object, including the insides and other parts not easily seen.
- ▶ Such details can be drawn with **hidden lines**, but this works well only when the hidden part has a simple shape. For complicated shapes, hidden lines become confusing.



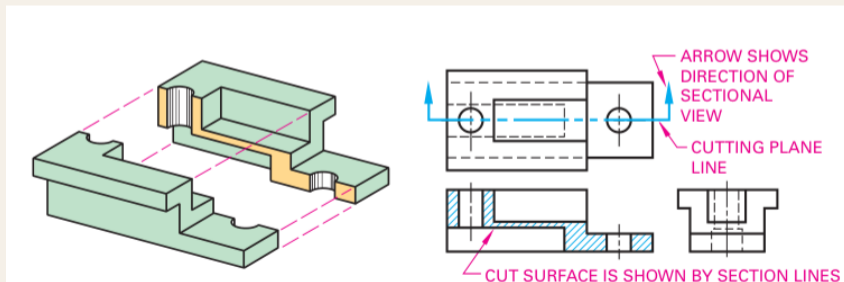
- In these cases, a special view called a **section** (or sectional view) should be drawn.



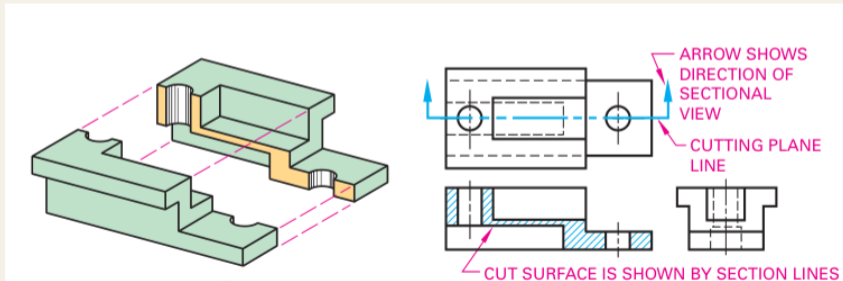
- ▶ In these cases, a special view called a **section** (or sectional view) should be drawn.
- ▶ A sectional view shows an object **as if part of it were cut away** to expose its insides.























- Imagine a wide-blade knife cutting through an object. The path of this knife is called the **cutting plane**.



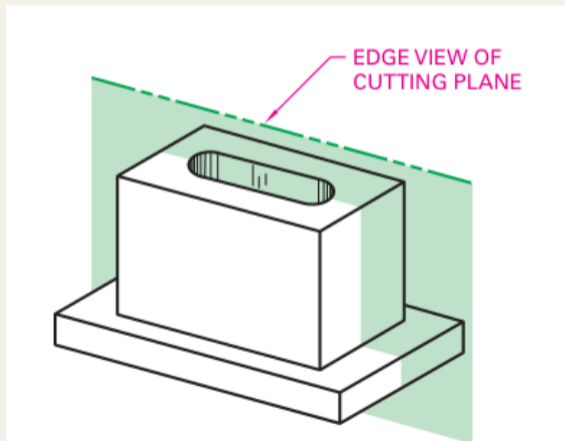
- ▶ Imagine a wide-blade knife cutting through an object. The path of this knife is called the **cutting plane**.
- ▶ On the sectional view, the cut surface is marked with thin, evenly spaced lines known as **section lining** or **crosshatching**.



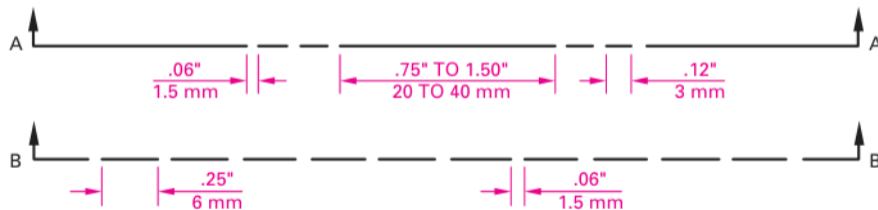
- Section lining symbols are defined by **ASME** to indicate specific materials for a sectioned object.

				
CAST IRON AND MALLEABLE IRON, ALSO FOR GENERAL USE FOR ALL MATERIALS	STEEL	BRONZE, BRASS, COPPER, AND COMPOSITIONS	WHITE METAL, ZINC, LEAD, BABBITT, AND ALLOYS	MAGNESIUM, ALUMINUM AND ALUMINUM ALLOYS
				
RUBBER, PLASTIC, ELECTRICAL INSULATION	CORK, FELT, FABRIC, LEATHER, FIBER	SOUND INSULATION	THERMAL INSULATION	FIREBRICK AND REFRACTORY MATERIAL
				
ELECTRIC WINDINGS, ELECTROMAGNETS, RESISTANCE, ETC.	CONCRETE	BRICK AND STONE MASONRY	MARBLE, SLATE, GLASS, PORCELAIN, ETC.	EARTH
				

- ▶ The **cutting-plane line** represents the edge view of the cutting plane.

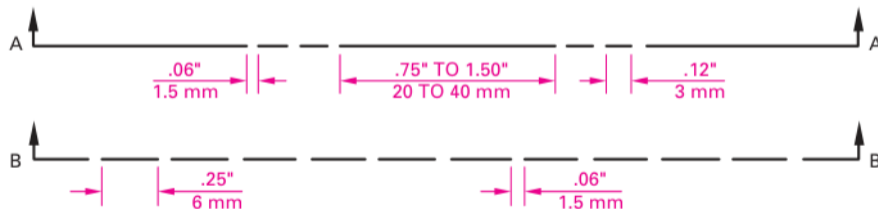


- ▶ ASME specifies **two forms** for cutting-plane lines, as shown in the figure.



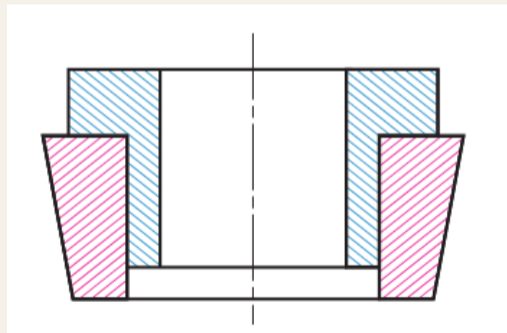
NOTE: ALL SIZES ARE ESTIMATED, NOT MEASURED.

- ▶ ASME specifies **two forms** for cutting-plane lines, as shown in the figure.
- ▶ The first form is more commonly used. The second shows up well on complicated drawings.



NOTE: ALL SIZES ARE ESTIMATED, NOT MEASURED.

- ▶ When a drawing shows **more than one piece** in section, place the section lines in a **different direction** on each piece, using common angles of 30° , 45° , or 60° .



Section 2

Types of Sectional Views

1 Understanding Sectional Views

2

- Full Sections
- Offset Sections
- Half Sections
- Broken-Out Sections
- Revolved Sections
- Auxiliary Sections
- Removed Sections
- Phantom Sections

3 Special Cases

4 Practice Example

2

Eight types of sectional views

Sectional views can be drawn in different ways to make internal features as clear as possible while keeping the drawing simple:

- 1 Full Sections

Eight types of sectional views

Sectional views can be drawn in different ways to make internal features as clear as possible while keeping the drawing simple:

- ① Full Sections
- ② Offset Sections

Eight types of sectional views

Sectional views can be drawn in different ways to make internal features as clear as possible while keeping the drawing simple:

- ① Full Sections
- ② Offset Sections
- ③ Half Sections

Eight types of sectional views

Sectional views can be drawn in different ways to make internal features as clear as possible while keeping the drawing simple:

- ① Full Sections
- ② Offset Sections
- ③ Half Sections
- ④ Broken-Out Sections

Eight types of sectional views

Sectional views can be drawn in different ways to make internal features as clear as possible while keeping the drawing simple:

- ① Full Sections
- ② Offset Sections
- ③ Half Sections
- ④ Broken-Out Sections
- ⑤ Revolved Sections

Eight types of sectional views

Sectional views can be drawn in different ways to make internal features as clear as possible while keeping the drawing simple:

- ① Full Sections
- ② Offset Sections
- ③ Half Sections
- ④ Broken-Out Sections
- ⑤ Revolved Sections
- ⑥ Auxiliary Sections

Eight types of sectional views

Sectional views can be drawn in different ways to make internal features as clear as possible while keeping the drawing simple:

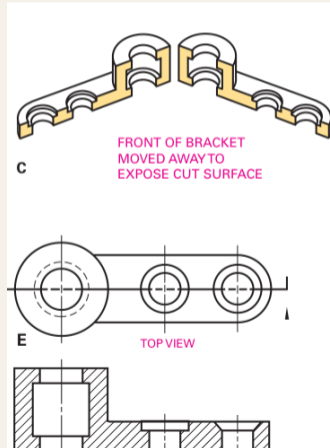
- 1 Full Sections
- 2 Offset Sections
- 3 Half Sections
- 4 Broken-Out Sections
- 5 Revolved Sections
- 6 Auxiliary Sections
- 7 Removed Sections

Eight types of sectional views

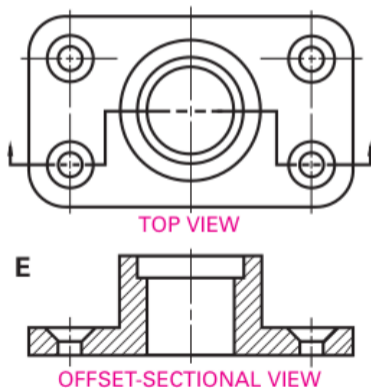
Sectional views can be drawn in different ways to make internal features as clear as possible while keeping the drawing simple:

- 1 Full Sections
- 2 Offset Sections
- 3 Half Sections
- 4 Broken-Out Sections
- 5 Revolved Sections
- 6 Auxiliary Sections
- 7 Removed Sections
- 8 Phantom Sections

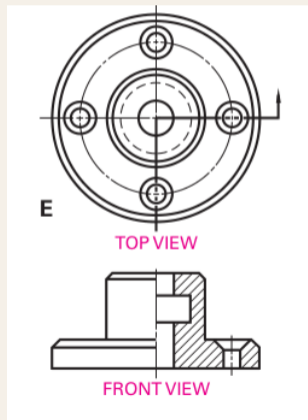
A **full section** shows an object as if it were cut completely across from one end or side to the other.



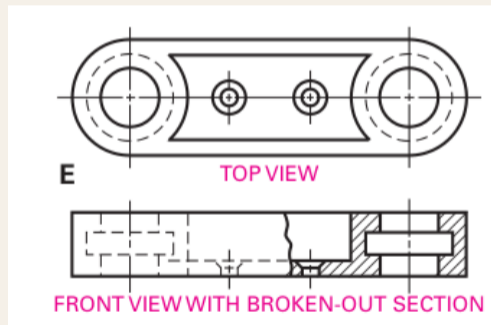
In an **offset section**, the cutting plane is shifted (offset) to pass through a detail or to avoid a part, rather than going straight through the object.



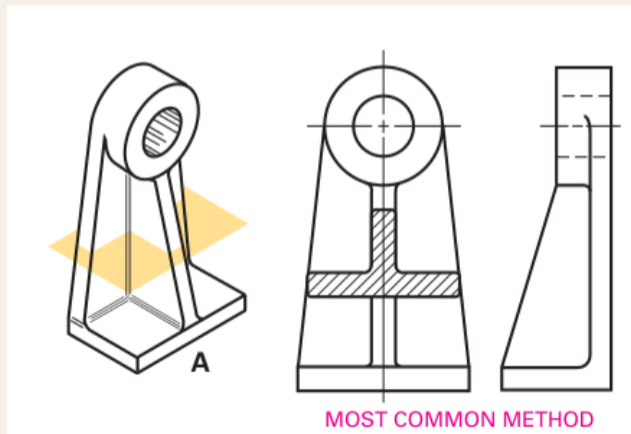
A **half section** is one-half of a full section. While a full section shows the object as if half has been cut away, a half section shows only **one-quarter** cut away.



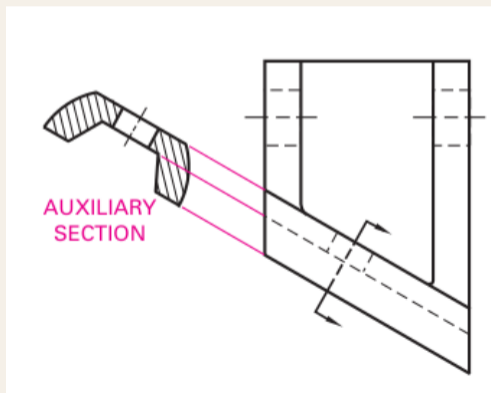
A **broken-out section** shows an object as it would look if a portion were cut partly away by a cutting plane and then “broken off” to reveal the cut surface and the interior.



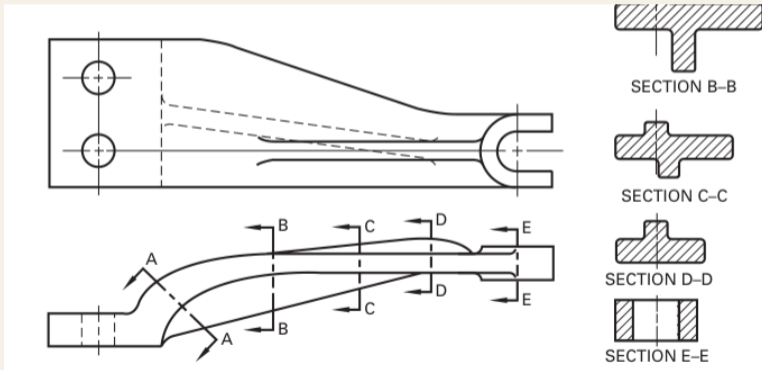
Imagine a cutting plane passing through part of an object, then think of that cut surface as **revolved** 90° into the plane of the drawing.



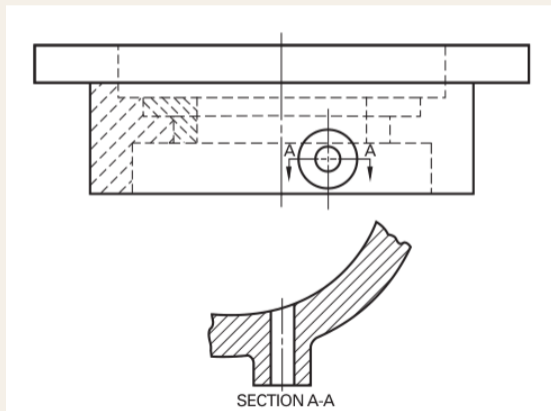
When a cutting plane passes through the object **at an angle**, the resulting sectional view is called an **auxiliary section**, and it is drawn like any other auxiliary view.



When a sectional view is taken from its normal position on the drawing and **moved elsewhere** on the sheet, the result is a **removed section**.



A **phantom section** (also called a *hidden section*) shows in one view both the **inside and the outside** of a non-symmetrical object.



Section 3

Special Cases

① Understanding Sectional Views

② Types of Sectional Views

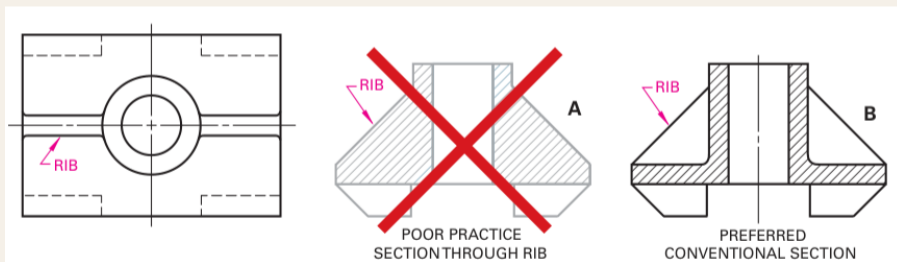
③ Ribs and Webs in Section
Hidden and Visible Lines
Parts Not Sectioned

④ Practice Example

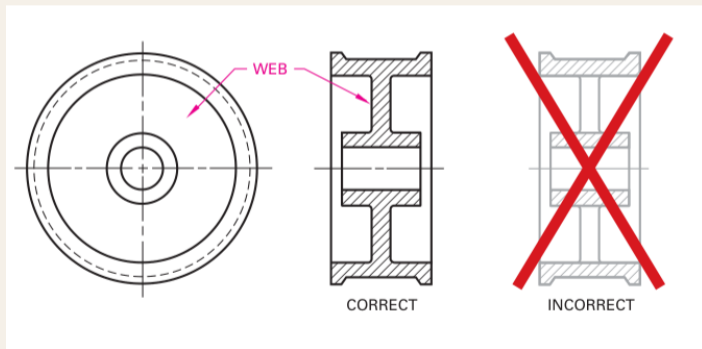
3

Sometimes drafters make exceptions to general sectioning rules; these exceptions have become standard practice. For example, although showing hidden lines in a section view is generally undesirable, it is allowed in special cases to **improve accuracy and clarity**.

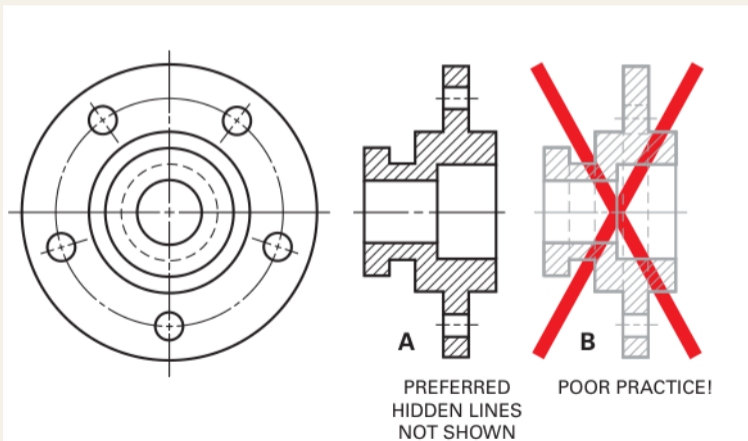
Ribs and webs are **thin, flat parts** used to brace or strengthen another part of the object. A true section through an object containing ribs or a web structure often does not adequately describe the part.



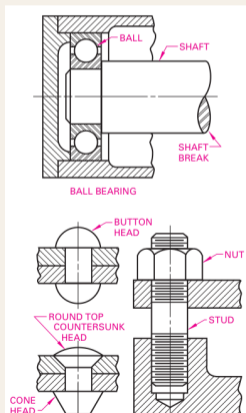
If a cutting plane passes through a rib, a web, or any other thin flat part **at right angles** to the flat side, draw section lines for that part.



Do **not** draw hidden lines on sectional views unless they are needed for dimensioning or for clearly describing the shape.



Do **not** draw section lines on spokes and gear teeth. In addition, do not section shafts, bolts, pins, rivets, or similar items when the cutting plane passes through them **lengthwise** (through the axis).



Section 4

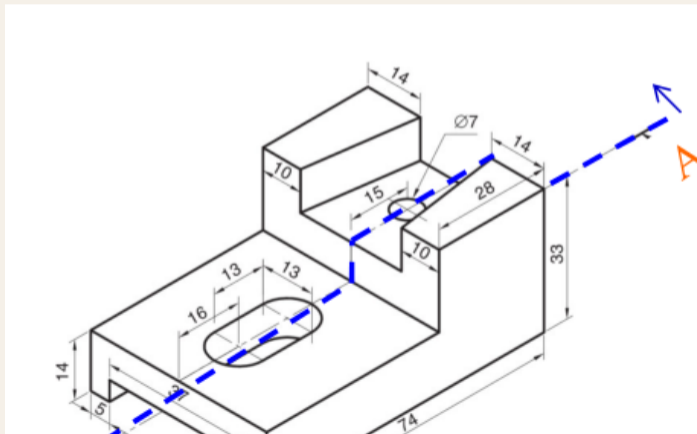
Practice Example

- ① Understanding Sectional Views
- ② Types of Sectional Views
- ③ Special Cases
- ④

4

Exercise

Draw the sectional Front View, Top View and Side View of the object shown in the figure below.



Thank you for your attention.

Mr. ZENNADI Karim – ENP