Lecture 3: Engr 150

This lecture:

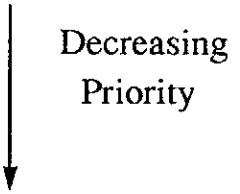
- Line Precedence
- Missing Views

Line Precedence

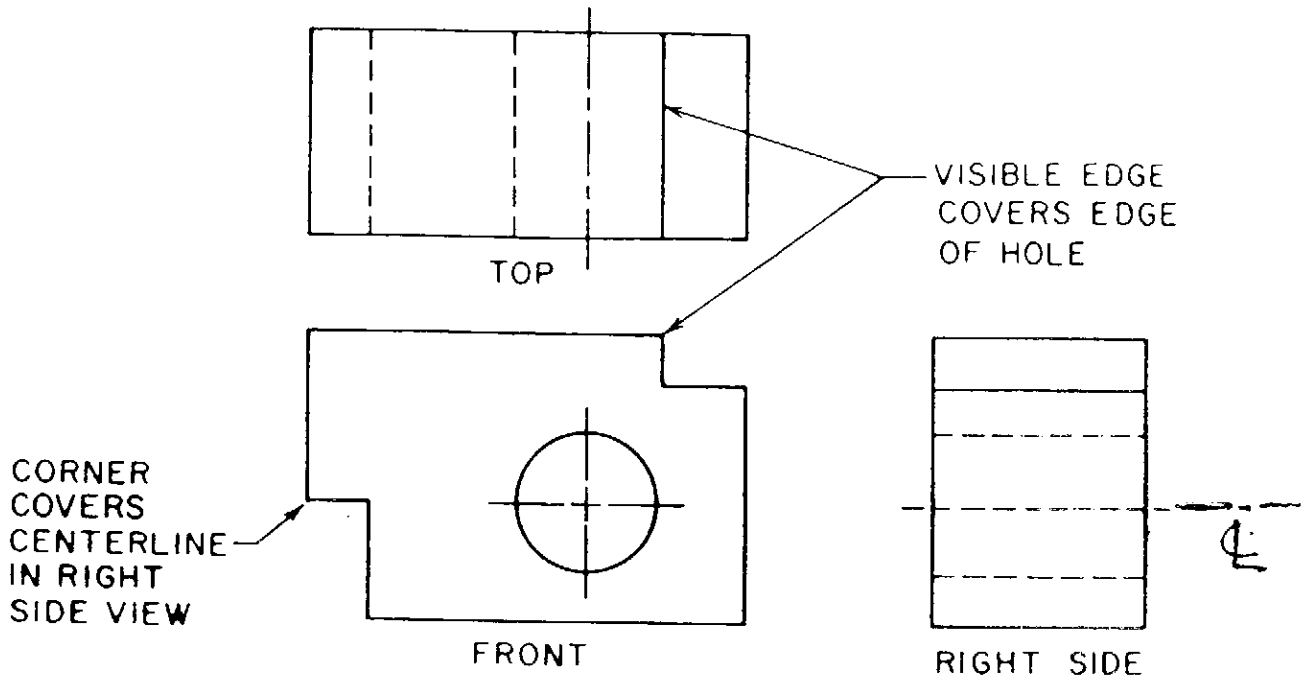
In orthographic views there are case when different line types overlap.

The precedence of the lines in these cases is:

1. Visible Lines
2. Hidden Line
3. Centrelines



Example:


VISIBLE EDGE
COVERS EDGE
OF HOLE
TOP
CORNER
COVERS
CENTERLINE
IN RIGHT
SIDE VIEW
FRONT
RIGHT SIDE

Generating Missing Views

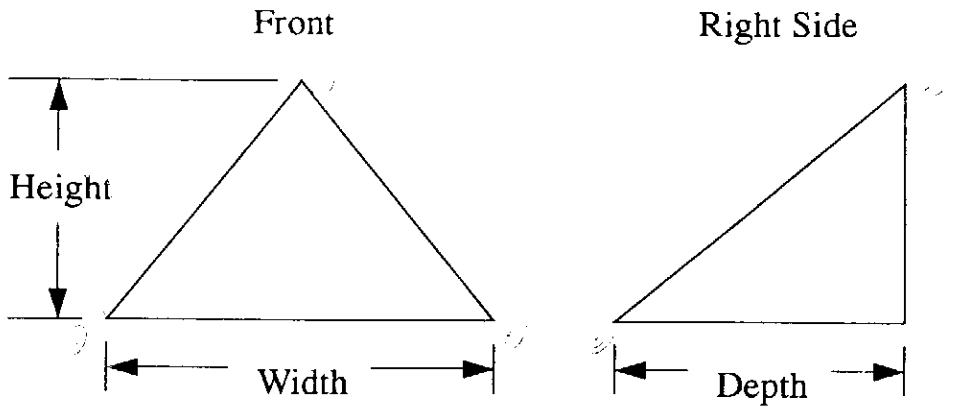
As mentioned in the previous lecture, only the number of views required to specify the object's features are typically given.

- Generating the missing (redundant) views may allow the object's features to be more clearly seen.
- Useful technique in communicating the shape of an object to others.
- Useful exercise in learing to read and produce engineering drawings.

Guidelines for Generating Missing Views:

1. Use alignment of width, height. and depth features.
2. Sketch supplemental 3-D pictorial.
3. Keep track of features such as corners or holes.
4. Hidden lines in on view may become visisble in another.
5. If in doubt use projection lines!
6. Number corners, so respective corners can be aligned between views.
7. Acknowledge that alternative missing views may be possible for the same given views.

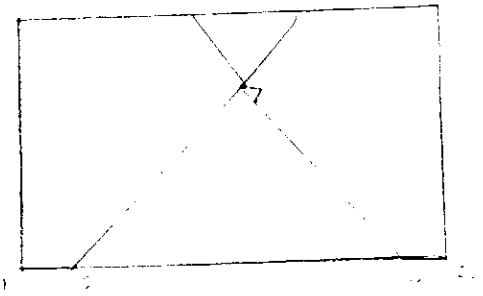
Example 1:

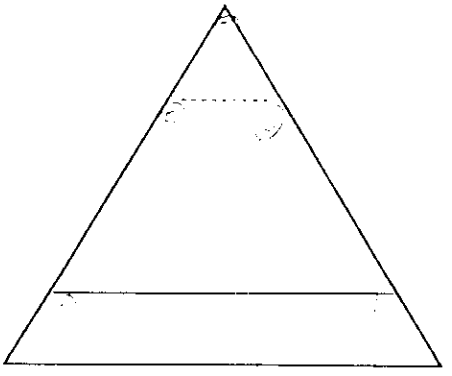


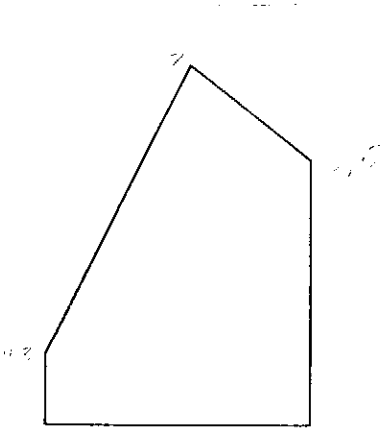
3-D pictorial:

Preliminary Final

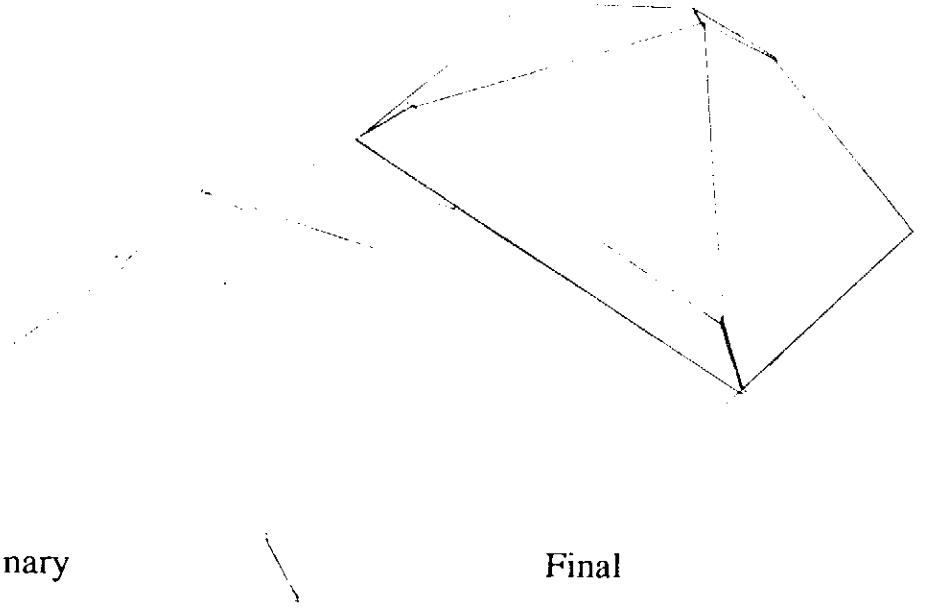
Example 2:







3-D pictorial:

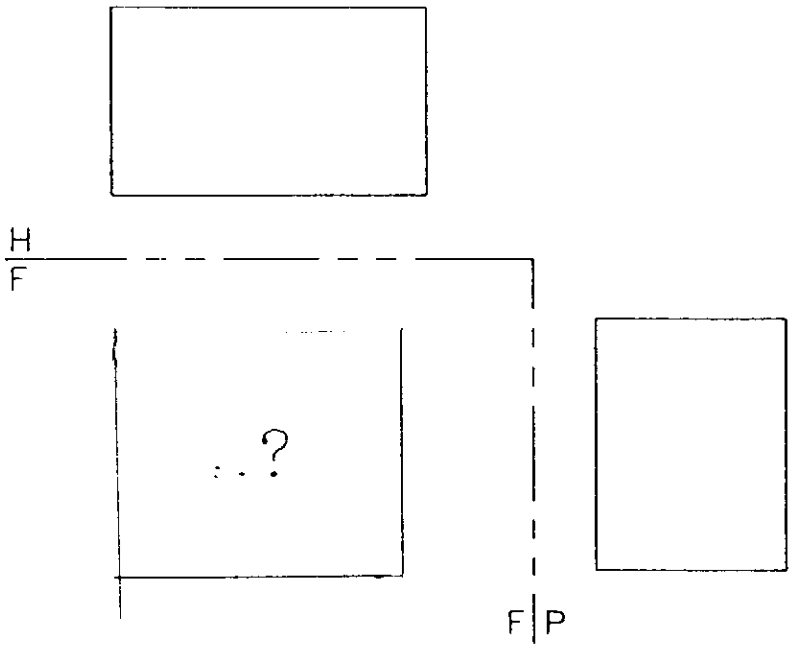


Preliminary

Final

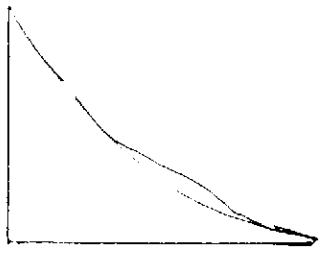
Exercise: Missing Views

Two views are provided for an object. Sketch three possible front views.

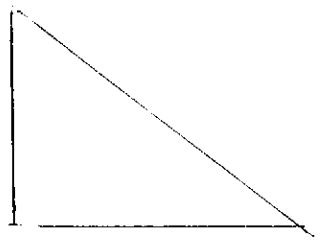


1.

2.

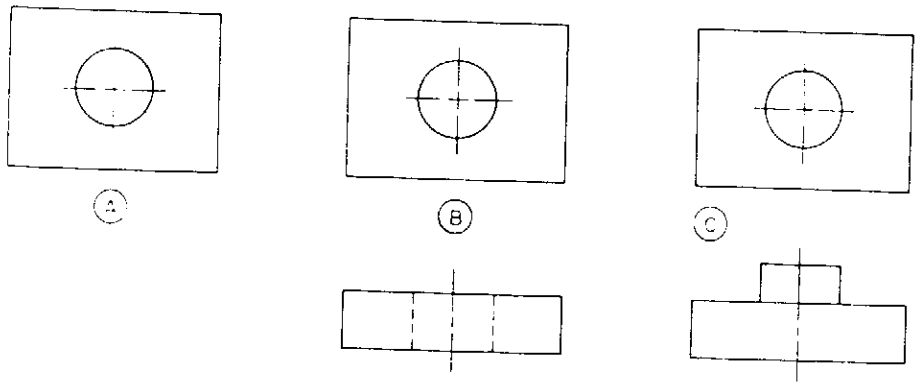


3.



Alternative Missing Views

- the given views may not always generate a single possible solution for the missing view.
- i.e.



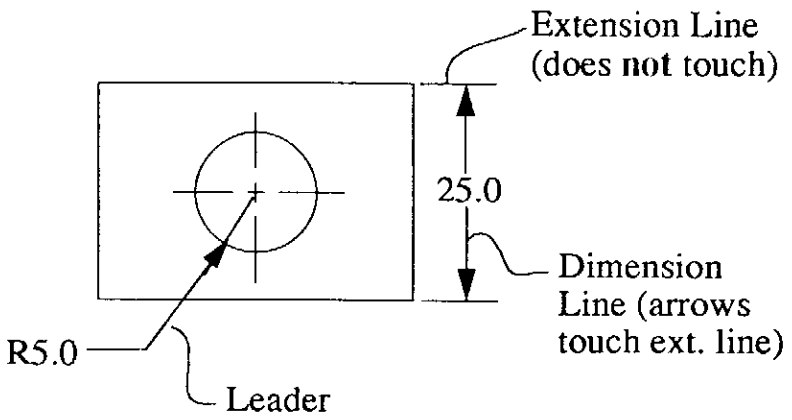
Exercises: 13,22

Next Class: Dimensioning

Dimensioning

- Application of detailed size information to a drawing
- Many rules for dimensioning exist
  - The goal is provide all information required to make the part in a CLEAR and CONCISE manner.

Terminology

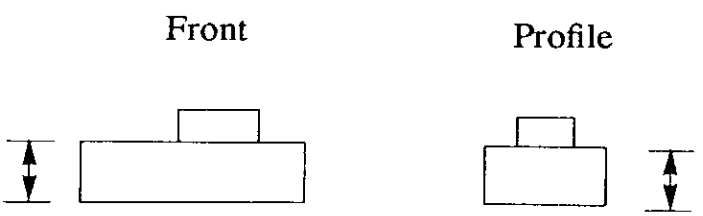


Feature: a geometric shape or entity on the object (i.e. an edge, a cylinder,...)

Dimensioning Rules:

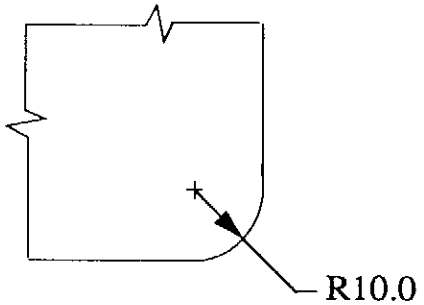
1. Dimension each feature once where the shape shows, except for outside diameters, which are dimensioned in the non-circular view.

   a) "Dimension each feature once"
      - Do **not** dimension any feature in more than one view.

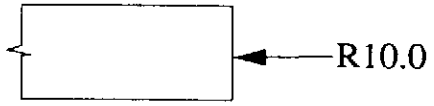


INCORRECT

b) "Dimension shape where it shows"

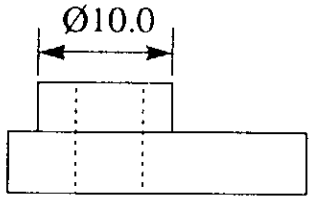


CORRECT

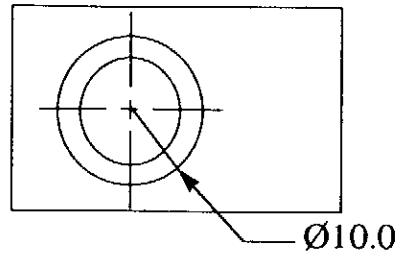


INCORRECT

c) "Outside diameters dimensioned in non-circular view"



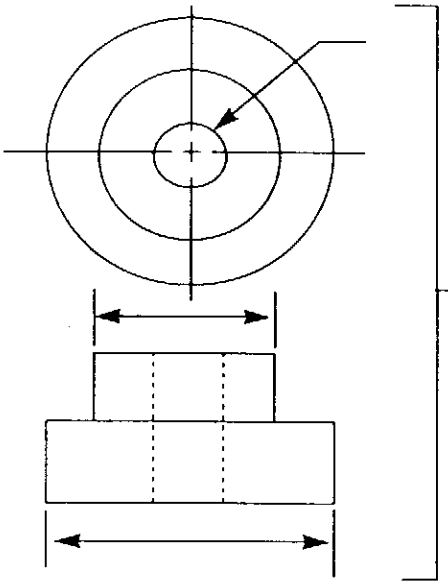
CORRECT



INCORRECT

Reason: To distinguish between "holes" and outside diameters more readily.

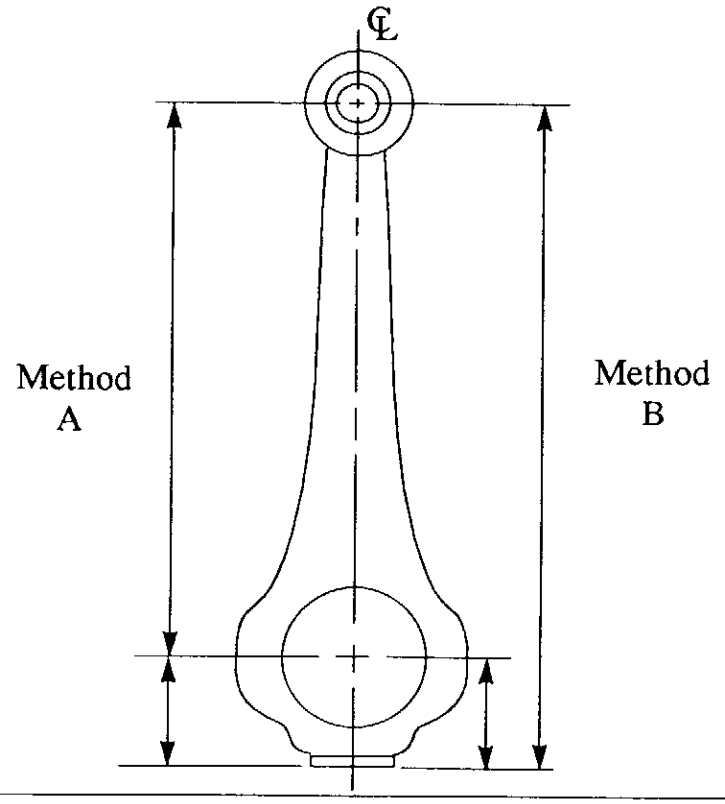
- **holes** dimensioned in **circular** view
- **Outside diameters** dimensioned in **edge** view



Clearer than if all dimensions were place on one view

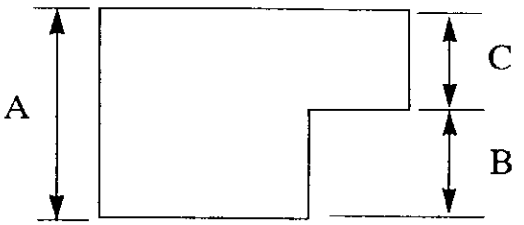
2. Consider influence of part function on dimensioning

- Dimensions should indicate important feature relationships.
- Example: Connecting Rod
  - The centre distance between piston ring and crankshaft is very important in the manufacturing of the rod ⇒ method A is preferred



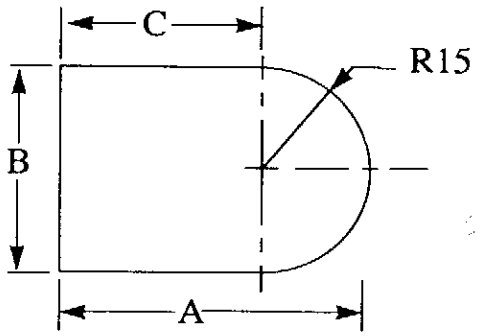
3. Avoid Redundancy
   - Rule 1 states that each feature should only be dimensioned once.

Example 1:



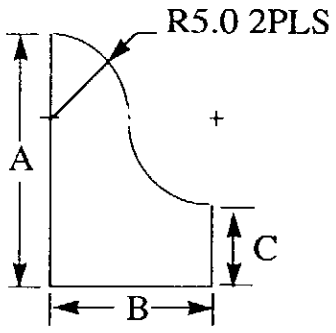
- Any 2 of the dimensions (A,B & C) are required, one **must** be discarded.
- i.e 'C' is already determined from knowledge of A & B.
- The third dimension can be retained if it is followed by the symbol (REF), meaning "Reference Dimension" or if it is enclosed in parenthesis [i.e. (B)]
- Reference dimensions are often useful to craftsmen since they save time in calculations.
- Note: any one of A, B, or C may be dropped but it is customary to retain the overall dimension 'A' since the material may have to be cut from raw stock.

Example 2: Tangent Radii



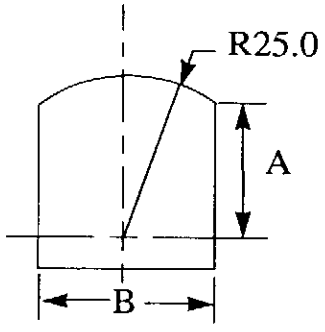
- 'B' **not** required if R is given since B =2R (or value of R not required)
- 'C' **not** required since centre of radius is known from A & R

Example 3:



- B & C **not** required if A & R are given

Example 4: Non-Tangent Radius



- Radius is **not** tangent to the sides, therefore the location of its centre **must** be given.

Exercises: 43, 45

Next Class: Sectioning