JOB ROLE – AUTOMOTIVE SERVICE TECHNICIAN

Sector: Automotive
(Qualification Pack Code : **ASC/Q01402)**

PSS Central Institute of Vocational Education
Shyamla Hills, Bhopal – 462013, Madhya Pradesh, India

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UNIT 1: Introduction to Engineering Geometrics and Drawing

Session 2: Engineering Drawing

Content

Session Objectives

1. The student will be able to explain importance of engineering drawing.
2. Able to identify different orthographic views of the drawing.
3. Able to construct different orthographic views of the simple objects.

Introduction

A drawing is a graphical representation of a real object. An engineer expresses his ideas on a paper through the medium of drawing. A complete working drawing of a job is followed by giving an accurate shape to the raw materials, according to the drawing. The purpose of a drawing is to define and specify the shape and size of a particular object by means of lines. A good drawing gives full information about the object in a precise way. The ability to read and understand information contained on drawings is essential to perform most engineering-related jobs. Engineering drawings are the industry's means of communicating detailed and accurate information on how to fabricate, assemble, troubleshoot, repair, and operate a piece of equipment or a system. symbols used on the various types of drawings.

Drawing Scale

In order to use just one sheet, you could then use 1 mm on your drawing to represent 20 mm on the real-life object. You can write this situation as 1:20 or 1/20 or 1 to 20.

Notice that the first number always refers to the length of the drawing on paper and the second number refers to the length of real-life object.

The drawing scale is also called representative fraction (RF) shows instantly the ratio of the size of the line on your drawing and the natural size. The ratio of numerator to denominator of the fraction is the ratio of drawn size to natural size. Thus, an RF of 1/20 means that the actual size of the object is twenty times the size of the drawing of that object.

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Drawing Scale

- A scale is simply the ratio of the linear dimension appearing on the drawing compared to the corresponding linear dimension on the object.
- A scale has no units as it is simply a ratio (i.e. dimension on drawing : dimension on object)
- Scales are used either for enlargements or reductionsThe scale of 1:1 (read as one-to-one) implies the object has been drawn to true size. A scale of say 2:1 (read as two-to-one) implies that the object has been enlarged twice its true size. A scale of 1:2 (read as one-to-two) implies that the object has been reduced to its half size, etc.

Dimensions of Drawing Sheets

The ISO most recommended paper sizes for technical drawings are known as A-FORMATS. In the A-Format series, the largest size is A0. The size of an A1 paper is half the size of A0 while A2 is half the size of A1 and so forth. Note that a higher order paper size (which is always smaller in size) is obtained by simply halving the preceding size along its longer side. For technical drawings A4 is considered to be the smallest paper size. The A format paper sizes are shown below:

Designation	Dimensions in mm
A0	**841 X 1189**
A1	**594 X 841**
A2	**420 X 594**
A3	**297 X 420**
A4	**210 X 297**

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Basic Line Types

Type of lines
Continuous thick line
Continuous thin line
Dash thick
Chain thin line
Continuous thin wavy
Continuous thin with zig-zag
Short dashes gap 1, length 3 mm
Long chain thick at end and thin elsewhere

Meaning of lines

Visible or object lines represent features that can be seen in the current view.

Hidden lines represent features that can not be seen in the current view.

Center line represents symmetry, path of motion, centers of circles, axis of axisymmetrical parts.

Dimension, leader and Extension lines indicate the sizes and location of features on a drawing.

Cutting Plane lines are used to represent the location of an imaginary cut has been made, so that the interior of the object can be viewed.

Phantom lines are used to represent imaginary features or objects, such as a rotated position of a part.

Break lines are used to represent imaginary cut, so that the interior of the object can be viewed.

Example : Line conventions in engineering drawing

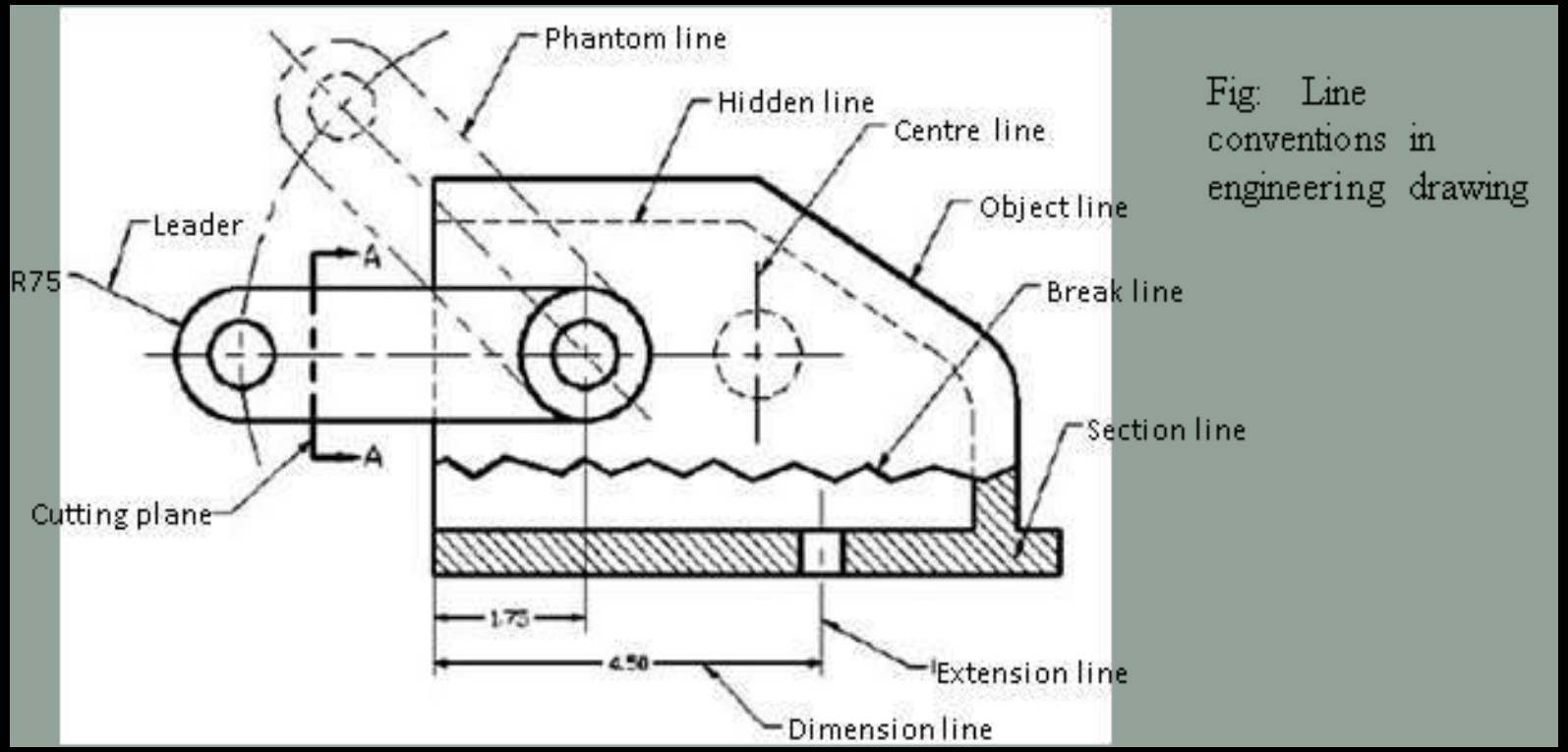

Fig: Line conventions in engineering drawing

Projections

A view of a part for design is known technically as a projection. A projection is view conceived to be drawn or projected onto a plane known as the plane of projection. A system of views of an object formed by projectors from the object perpendicular to the desired planes of projection is known as orthographic or multiview projections. This system of required views provides for the shape description of the object.

Dimensioning

To enable productions of machine parts/components, all the relevant dimensions have to appear on the drawing. The practice is that any dimension is shown only once in that view in which it appears more explicitly. For this reason most of the important dimensions appear in the front view. Repetitions are discouraged unless clarity necessitates this. To keep the drawing clean, it is advised to put all the dimensions outside the drawing, except where and when this is unavoidable.

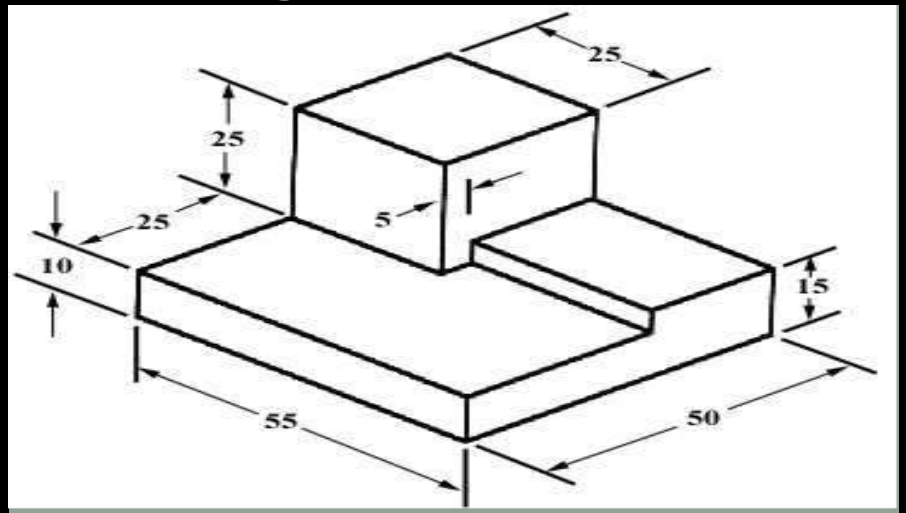

Fig: Dimensioning of the object

Drawing Sheet Layout

Standard layouts of drawing sheets are specified by the various standards organizations. Fig- , shows layout of a typical sheet, showing the drawing frame, a typical title block, parts list and the space for orthographic projections.

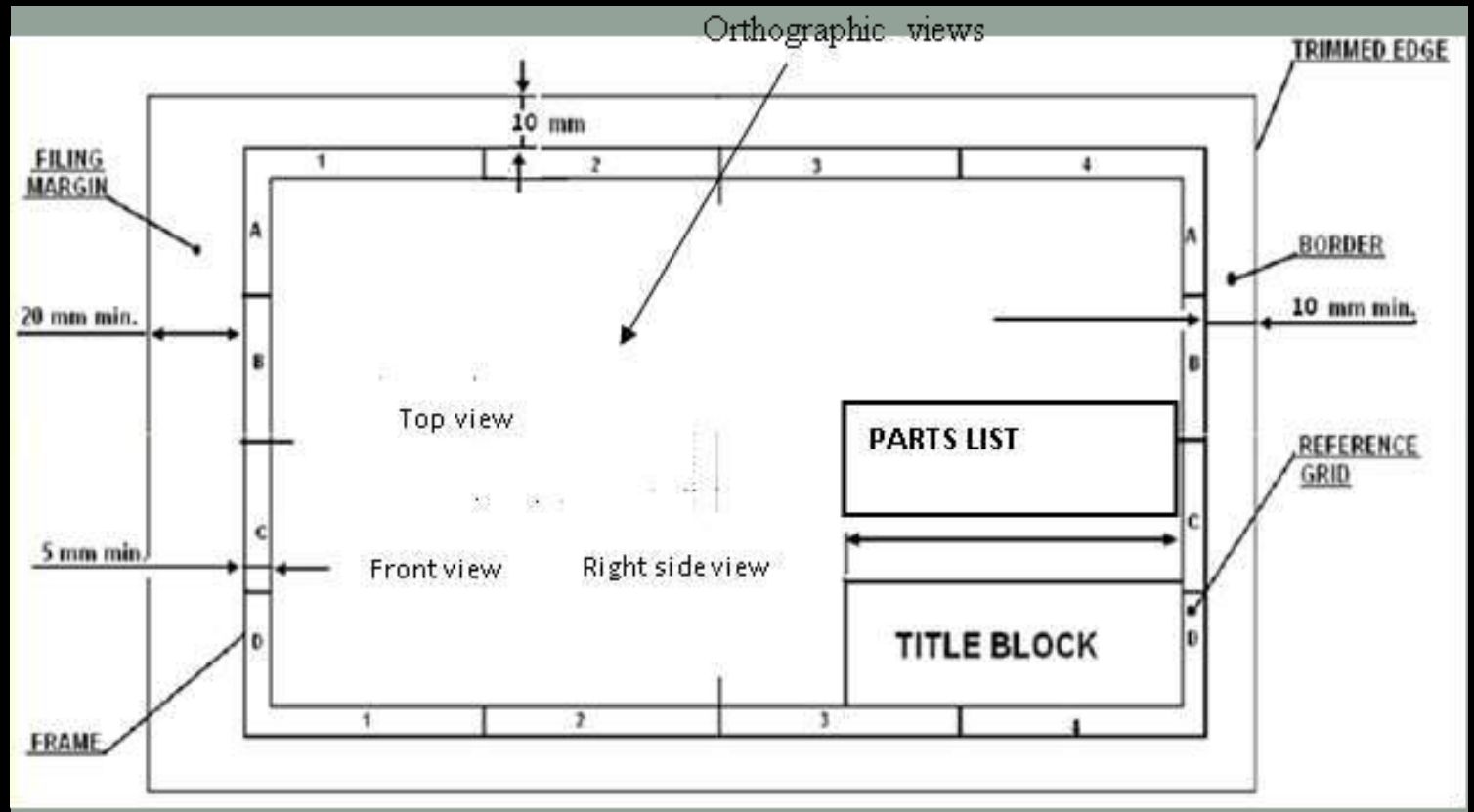

Fig: Layout of drawing sheet

Reading Drawings

Technical drawings are used to visualize the product/ component to be manufactured, built or assembled. A technical drawing describes shape, dimensions, and materials of construction and overall look of the object being created. To read a drawing, you must know how engineers/draughtsman uses lines, dimensions, and notes to communicate their ideas on paper. Think of drawings as a form of communication. They are intended to help you understand all the neces-sary information you need to fabricate and assemble an object regardless of the complexity. It is important that you learn to read drawings.

Reading Drawings

1. Firstly, make sure it is the right drawing you are reading, see the name and part no of the drawing.
2. Look at the Title Block on the drawing which is located in the lower right of the drawing. The Title Block contains the information about the name of the person who has drawn it, checked it, name of the firm/institute, drawing number, part number, projection angle and the scale of the drawing. This will help you to know the component's information.
3. shows many of the different types of lines that are used in drawings. Each line has a specific meaning you must understand to interpret a drawing correctly.

Reading Drawings

4. Look at the drawing shown in Fig- . This type of drawing is called a pictorial drawing. These draw¬ings are frequently used to show how an object should appear after it is manufactured. Pictorial drawings are used for simple objects.
5. For a more complex object, as shown in Fig- , it becomes too difficult to provide a com¬plete description in a pictorial drawing. In this case, it is common practice to prepare orthographic drawings to describe the object fully.

Summary

In this session you have learnt about, A drawing is a graphical representation of a real object. An engineer expresses his ideas on a paper through the medium of drawing. A complete working drawing of a job is followed by giving an accurate shape to the raw materials, according to the drawing.

The drawing scale is also called representative fraction (RF) shows instantly the ratio of the size of the line on your drawing and the natural size. The ratio of numerator to denominator of the fraction is the ratio of drawn size to natural size. Thus, an RF of 1/20 means that the actual size of the object is twenty times the size of the drawing of that object.

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