محاضرة رقم 1

Drawing Instruments and Accessories

1.1 Introduction

Drawing Instruments and Accessories Engineering drawing is a two dimensional representation of three dimensional objects. In general, it provides necessary information about the shape, size, surface quality, material, manufacturing process, etc., of the object. It is the graphic language from which a trained person can visualize objects.

The subject in general is designed to impart the following skills.
1. Ability to read and prepare engineering drawings.
2. Ability to make free - hand sketching of objects.
3. Power to imagine, analyses and communicate, and
4. Capacity to understand other subjects.

Drawing Instrument and Aids

The Instruments and other aids used in draughting work are listed below:
1. Drawing board 2. Mini draughter 3. Instrument box 4. Set squares 5. Protractor 6. Set of scales 7. French curves 8. Drawing sheets 9. Pencils 10. Templates

Drawing Board

Until recently drawing boards used are made of well seasoned softwood of about 25 mm thick with a working edge for T-square. Nowadays mini-draughters are used instead of T-squares which can be fixed on any board. The standard size of board depends on the size of drawing sheet size required.Fig.1 represent the drawing board that used in student drawing room.

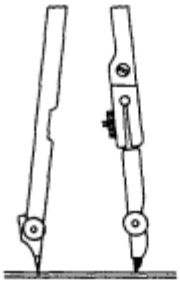


Fig.1-1 Drawing board

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Instrument Box

Instrument box contains 1. Compasses, 2. Dividers and 3. Inking pens. What is important is the position of the pencil lead with respect to the tip of the compass. It should be atleast I mm above as shown in Fig. 1.2 because the tip goes into the board for grip by 1 mm.



(a) Sharpening and position of compass lead



(b) Position of the lead leg to draw larger circles

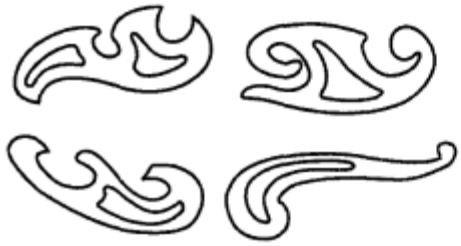
Fig.1-2

Set of Scales

Scales are used to make drawing of the objects to proportionate size desired. These are made of wood, steel or plastic (Fig.I.3). BIS recommends eight set-scales in plastic/cardboard with designations MI, M2 and so on as shown in Table 1.1 Set of scales

French Curves

French curves are available in different shapes (Fig. 1.3). First a series of points are plotted along the desired path and then the most suitable curve is made along the edge of the curve. A flexible curve consists of a lead bar inside rubber which bends conveniently to draw a smooth curve through any set of points.



(a) French curves



(b) Flexible curve

Fig. 1.3 (a) French curves (b) Flexible curve

Templates

These are aids used for drawing small features such as circles, arcs, triangular, square and other shapes and symbols used in various science and engineering fields (Fig.l.4).

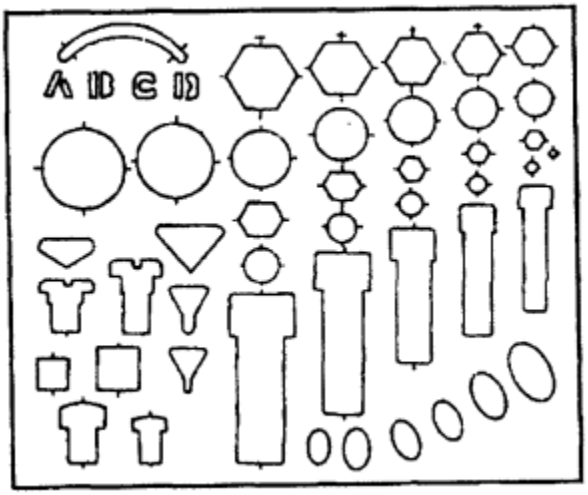


Fig.1.4

Pencils

Pencils with leads of different degrees of hardness or grades are available in the market. The hardness or softness of the lead is indicated by 3H, 2H, H, HB, B, 2B, 3B, etc. The grade HB denotes medium hardness oflead used for general purpose. The hardness increases as the value of the numeral before the letter H increases. The lead becomes softer, as the value of the numeral before B increases (Fig.l.5).

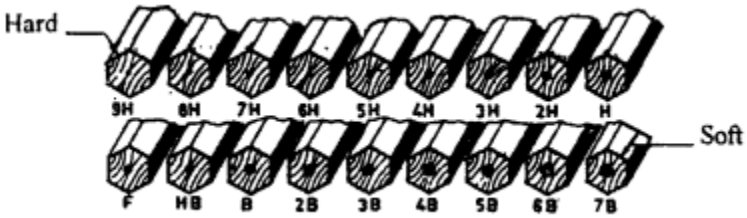


Fig.1.5 Types of pencils

The selection of the grade depends on the line quality desired for the drawing. Pencils of grades H or 2H may be used for finishing a pencil drawing as these give a sharp black line. Softer grade pencils are used for sketching work. HB grade is recommended for lettering and dimensioning. Nowadays mechanical pencils are widely used in place of wooden pencils. When these are used, much of the sharpening time can be saved. The number 0.5,0.70 of the pen indicates the thickness of the line obtained with the lead and the size of the lead diameter. Micro-tip pencils with 0.5 mm thick leads with the following grades are recommended. Fig. 1.6 Mechanical Pencil **HB** Soft grade for Border lines, lettering and free sketching

H Medium grade for Visible outlines, visible edges and boundary lines

2H Hard grade for construction lines, Dimension lines, Leader lines, Extension lines, Centre lines, Hatching lines and Hidden lines.

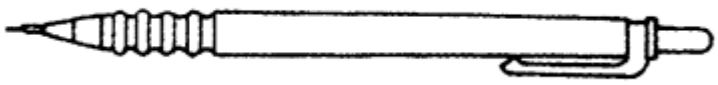


Fig. 1.6 Mechanical pencil