Introduction to Engineering drawing

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ENGINEERING DRAWING

- 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.

Drawing Instruments and aids:

- The Instruments and other aids used in drafting work are listed below:
  - Drawing board
  - Set squares
  - French curves
  - Templates
  - Mini drafter
  - Instrument box
  - Protractor
  - Set of scales
  - Drawing sheets
  - Pencils

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-drafters 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.

Mini-Drafter:

- Mini-drafter consists of an angle formed by two arms with scales marked and rigidly hinged to each other .
- It combines the functions of T-square, set-squares, scales and protractor.
- It is used for drawing horizontal, vertical and inclined lines, parallel and perpendicular lines and for measuring lines and

Instrument Box

- Instrument box contains
  - Compasses,
  - Dividers and
  - Inking pens.

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 of lead 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.

Pencils

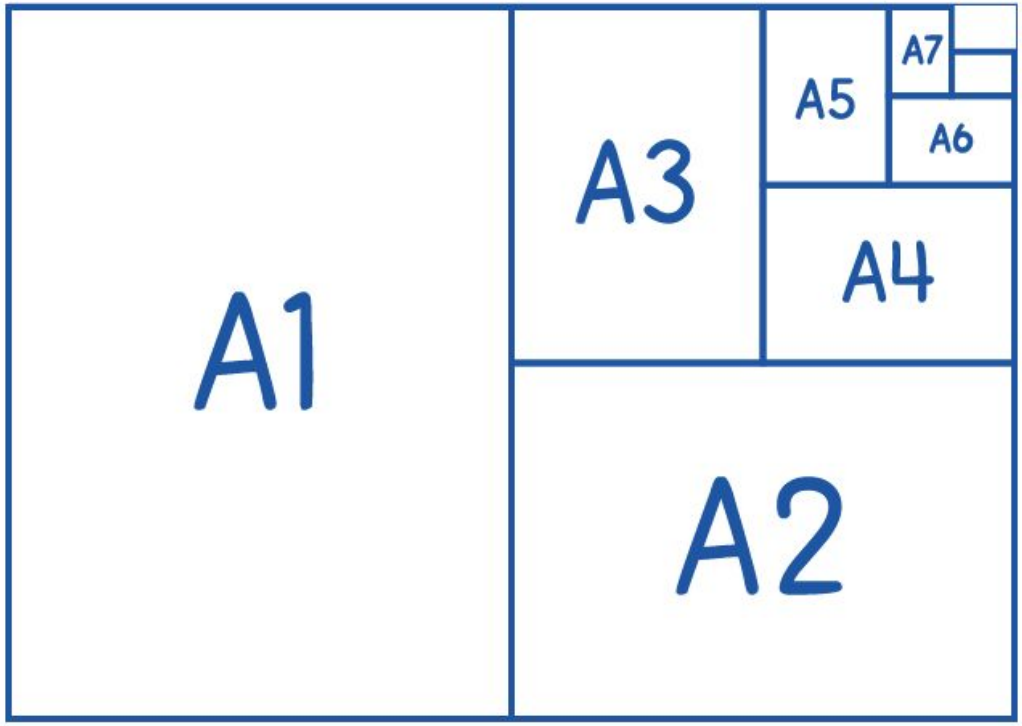
- HB Soft grade for Border lines, lettering and free sketching
- H Medium grade for Visible outlines, visible edges and boundary lines
- 2H Hard grade for construction lines, Dimension lines, Leader lines, Extension lines, Centre lines, Hatching lines and Hidden lines.

Drawing Sheet

- The standard drawing sheet sizes are arrived at on the basic Principal of x: y = 1: 2^ (1/2) and xy = 1 where x and y are the sides of the sheet.
- For example AO, having a surface area of 1 Sq.m; x = 841 mm and y = 1189 mm.
- The successive sizes are obtained by either by halving along the length or doubling the width, the area being in the ratio 1: 2.
- Designation of sizes is given in the fig. For class work use of A2 size drawing sheet is preferred

Drawing Sheet

Size	Height x Width (mm)	Height x Width (in)
4A0	2378 x 1682 mm	93.6 x 66.2 in
2A0	1682 x 1189 mm	66.2 x 46.8 in
A0	1189 x 841 mm	46.8 x 33.1 in
A1	841 x 594 mm	33.1 x 23.4 in
A2	594 x 420 mm	23.4 x 16.5 in
A3	420 x 297 mm	16.5 x 11.7 in
A4	297 x 210 mm	11.7 x 8.3 in
A5	210 x 148 mm	8.3 x 5.8 in
A6	148 x 105 mm	5.8 x 4.1 in
A7	105 x 74 mm	4.1 x. 2.9 in
A8	74 x 52 mm	2.9 x 2.0 in
A9	52 x 37 mm	2.0 x 1.5 in
A10	37 x 26 mm	1.5 x 1.0 in



Title Block

- The title block should lie within the drawing space at the bottom right hand comer of the sheet. The title block can have a maximum length of 170 mm and width of 65mm providing the following information.
  - Title of the drawing.
  - Drawing number.
  - Scale.
  - Symbol denoting the method of projection.
  - Name of the firm, and
  - Initials of staff, who have designed, checked and approved.

Lines

- Just as in English textbook the correct words are used for making correct sentences; in Engineering Graphics, the details of various objects are drawn by different types of lines.
- Each line has a definite meaning and sense to convey.

Lines

- **Visible Outlines, Visible Edges**: (Continuous wide lines) the lines drawn to represent the visible outlines/ visible edges / surface boundary lines of objects should be outstanding in appearance.
- **Dimension Lines (Continuous narrow Lines):** Dimension Lines are drawn to mark dimension.
- **Extension Lines (Continuous narrow Lines):** There are extended slightly beyond the respective dimension lines.
- **Construction Lines (Continuous narrow Lines):** These are drawn for constructing drawings and should not be erased after completion of the drawing.
- **Hatching / Section Lines (Continuous Narrow Lines):** These are drawn for the sectioned portion of an object. These are drawn inclined at an angle of 45° to the axis or to the main outline of the section.

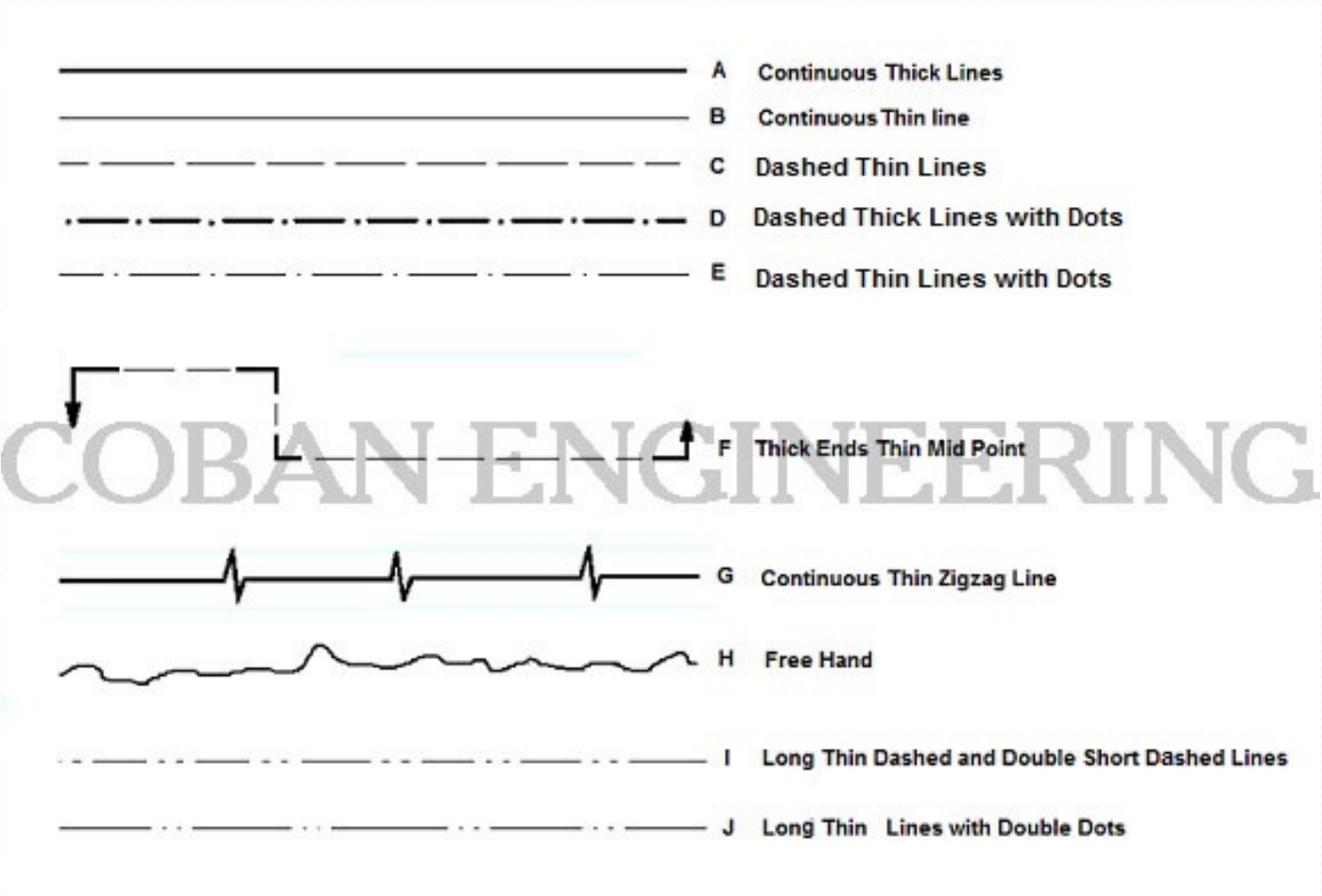
Lines

- **Guide Lines (Continuous Narrow Lines):** These are drawn for lettering and should not be erased after lettering.
- **Break Lines (Continuous Narrow Freehand Lines):** Wavy continuous narrow line drawn freehand is used to represent break of an object.
- **Break Lines (Continuous Narrow Lines With Zigzags):** Straight continuous narrow line with zigzags is used to represent break of an object.
- **Dashed Narrow Lines (Dashed Narrow Lines):** Hidden edges / Hidden outlines of objects are shown by dashed lines of short dashes of equal lengths of about 3 mm, spaced at equal distances of about 1 mm. the points of intersection of these lines with the outlines / another hidden line should be clearly shown.

Lines

- **Center Lines (Long-Dashed Dotted Narrow Lines):** These are drawn at the center of the drawings symmetrical about an axis or both the axes. These are extended by a short distance beyond the outline of the drawing.
- **Cutting Plane Lines**: Cutting Plane Line is drawn to show the location of a cutting plane. It is long-dashed dotted narrow line, made wide at the ends, bends and change of direction. The direction of viewing is shown by means of arrows resting on the cutting plane line.
- **Border Lines**: Border Lines are continuous wide lines of minimum thickness 0.7 mm.

Lines



Thank You