10.1 Engineering Drawings and Its Concepts

Engineering drawing is an essential tool in the field of engineering, serving as a precise graphical representation of objects, structures, and systems. It plays a crucial role in communicating technical details among engineers, designers, manufacturers, and builders, ensuring that the intended design is accurately understood and implemented. The fundamentals of standard drawing sheets include various standardized paper sizes such as A0, A1, A2, A3, and A4, defined by the International Organization for Standardization (ISO). These drawing sheets contain essential elements such as title blocks, borders, and revision tables, which provide crucial information about the drawing, including the project title, scale, date, and approval signatures. Proper organization of a drawing sheet ensures clarity and consistency in technical documentation.

Dimensions in engineering drawings represent the measurable attributes of an object, including lengths, widths, diameters, and angles. Proper dimensioning follows international standards like ISO 129 and ASME Y14.5, ensuring uniformity across different engineering fields. It includes various types such as linear dimensions, which define straight-line distances; angular dimensions, which measure angles between intersecting lines; and radial dimensions, which describe circular features. The use of tolerances, including limit dimensions and fits, ensures that manufactured parts meet the required specifications with acceptable deviations.

Scale is another fundamental aspect of engineering drawings, as real-world objects often need to be represented at a proportionate size. Engineers use different types of scales, including full scale (1:1), where the drawing size is the same as the actual size, enlarged scales (e.g., 2:1 or 10:1) for small components, and reduced scales (e.g., 1:10 or 1:100) for large structures like buildings or mechanical assemblies. Using the appropriate scale is crucial in making drawings readable and practical for manufacturing and construction.

Line diagrams are simplified graphical representations of systems, commonly used in electrical, mechanical, and plumbing engineering. These diagrams use standardized symbols to represent components and their connections, making complex systems easier to understand. Orthographic projection is a method of visually representing three-dimensional objects using multiple two-dimensional views. It follows parallel projection principles, showing different aspects of an object such as front, top, and side views. This method is essential in technical drawings, as it provides accurate measurements and eliminates perspective distortion.

Isometric projection or isometric view is a technique used to illustrate a three-dimensional object in a way that all three axes appear equally inclined at 120 degrees to each other. This projection helps engineers and designers visualize objects more effectively, particularly in mechanical and architectural drawings. Pictorial views, including perspective and oblique projections, are used to present objects in a way that closely resembles how they appear to the human eye. These views are commonly used in presentations and design concepts to provide a more realistic representation of an object.

Sectional drawings are used to reveal the internal features of an object by cutting through it and displaying a cross-sectional view. This technique helps engineers understand the internal structure and hidden components of complex assemblies. Sectional drawings can be classified into different types, including full sections, which cut through the entire object; half sections, which show only half of the internal view while keeping the other half intact; and offset sections, which follow a non-linear cutting plane to reveal important internal details.