UNIT 1

Introduction to Basic Technical Drawing

Engineers use drawings to communicate ideas to colleagues and co-workers

Learning Competencies:

Upon completion of this unit, you should be able to:

- ✓ Define drawing in your own words ;
- ✓ Write the role of drawing in human civilization;
- ✓ Explain how and when drawing originated;
- ✓ Distinguish the two classification of drawing;
- ✓ Describe the areas / professional disciplines of technical drawing;
- ✓ Describe some important applications of technical drawing in everyday life;
- ✓ State the advantage of CADD in related manual work;
- ✓ Explain the educational value of technical drawing.

1.1 History of Drawing

For what purpose drawing is used around your school or around your city?

People learned to draw pictures of the objects around them long before they learned to write. The ability to make simple drawings helped people develop their first written language. There were no words or characters in ancient writing. Ideas of things were conveyed by pictures of the battles, and hunting was recorded in these "picture" languages. Drawings carved by primitive people on rocks, walls of caves and so forth have survived to our day.

Many drawings of human beings, animals, fish and so on, made by our forefathers thousands of years ago, have been found on the eastern shore of lake Onega and on the shores of the White Sea. These drawings were carved on granite rocks with stone (flint) tools. (Fig.1.1)

History indicates that drawings were used in ancient times to describe the exact forms and sizes of structures. The Bible states that Solomon's Temple was "built of stone made ready before it was brought thither," indicating that drawings were used to describe the forms of and sizes of the individual members of historic structure.

The theory of projection drawing was advanced to an academic study by the introduction of two planes of projection at right angles to each other by French mathematician Gaspard Monge, near the end of the eighteenth century. This development provides the basis of descriptive geometry, the science which treats the graphical description of objects of three dimensions and provides problems designed to develop the ability to visualize and to solve problems.

The original and natural method of describing the forms of objects is by means of drawings. Written or spoken language is inadequate to describe any but the most elementary forms. There are two divisions of drawings; ***artistic* and *technical***. Artistic drawings are outside the scope of this text. An artistic drawing has many techniques and expressions that are not used in technical drawings. First of all, a technical drawing must communicate the same message to every user or reader of the drawing, whereas an artistic drawing is usually interpreted differently by everyone who sees it. To limit the interpretation to only one possible conclusion, the technical drawing is controlled by accepted standards, drawing "conventions" and projection techniques.

Technical drawing is the art and science of describing structures and structural details completely and accurately by graphical means.

Technical drawing may be made with instruments, or freehand, or partly with instruments and partly freehand. Instrumental drawing is the term usually applied to technical drawings executed with instruments; technical sketching applies to

such drawings executed without the aid of instruments.

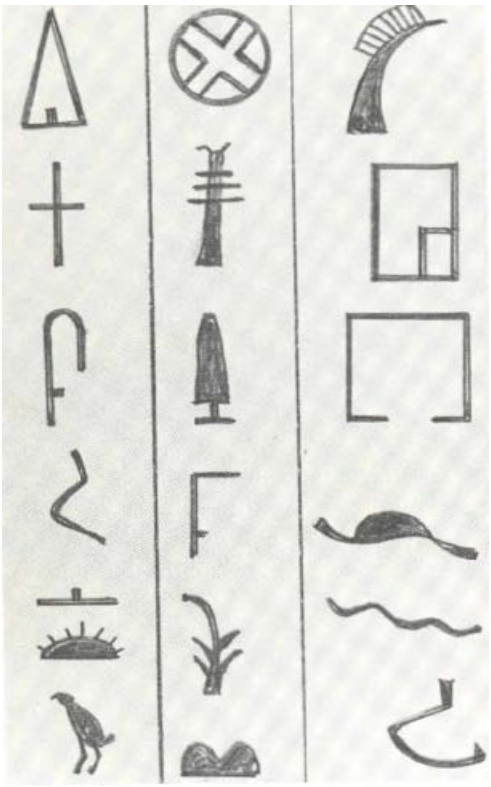

Fig. 1.1 Characters and objects taken from an ancient wall.

Activity 1.1

Show with simple line drawing the direction from your school to your home? Ask comment from your teacher.

1.2 Areas/Professional Disciplines of Technical Drawing

Drawing is a tool used by engineers and industrial designers to design a product, solve a problem, or produce a product. Almost everything around you began as an idea and then as a drawing. The buildings in which you live and work; the appliances in your home- dishwashers, can openers, dryers, toasters; the methods of transportation - cars, trains, ships, airplanes; the systems that support your life - plumbing, electricity; even what you wear was conceived and brought into being by the effective use of engineering drawings. Few items get manufactured or produced with out an engineering drawing.

Technical drawings must contain everything needed for proper interpretation of the design because design and manufacturing may be located far apart - often in different countries.

Therefore technical drawing has extensive application especially for architectures and engineers. So the art and design that goes into making buildings is known as architecture. To communicate all aspects of the design, detailed drawings are used. Architectural drawings describe and document an architect's design.

Engineering can be a very broad term. It stems from the Latin "*ingenerare*", meaning "to create". Because this could apply to everything that humans create, it is given a narrower definition in the context of technical drawing. Engineering drawings generally deal with mechanical engineered items, such as manufactured parts and equipment.

Engineering drawings are usually created in accordance with standardized conventions

for layout, nomenclature, interpretation, appearance (such as line styles), size, etc. Its purpose is to accurately and unambiguously capture all the geometric features of a product or a component. The end goal of an engineering drawing is to convey all the required information that will allow a manufacturer to produce that component.

1.3 Technical Drawing Today (Computer Aided Design and Drafting)

Technical drawings had been produced by the help of drawing instruments and traditional pencil-on-paper drafting is referred to as manual drafting. However, nowadays different softwares are available to do design and drafting.

Computer Aided Design and Drafting (CADD) involve any type of design activity that uses the computer to develop, analyze, modify or enhance an engineering design. CADD systems are based on interactive computer graphics. The engineer creates an image on the monitor by entering commands on the computer.

CADD can serve as a full partner in the design process, enabling the designers to do jobs that are simply not possible or feasible with manual equipment.

Besides increasing the speed with which a job is done, a CADD can perform many of the tedious and repetitive skills ordinarily required of drafter. It has proved to be, conservatively speaking, at least a 30 percent improvement in production in terms of time spent drawing.

1.4 Use and Educational Value of Technical Drawing

A student who successfully completed this course can use drawings to communicate technical information with engineers, designers, draft persons and other professionals. By studying technical drawing, a student becomes aware of how industry communicates technical information.

Technical drawing teaches the principle of accuracy and clarity in presenting the information necessary to produce products. In general, technical drawing helps students to understand a means of transmission of accurate information from designers to those who develop the objects that are described by drawing. Therefore, the course enables students to be motivated for further studies pertinent to drawing.

Key terms

Descriptive geometry: the system of geometry that uses plane projections and perspective drawings of solid figures, usually in order to describe and analyze their properties for engineering and manufacturing purposes.

UNIT SUMMARY

Technical drawing is a universal language by means of which the form, size, finish, colour, and construction of an object can be described accurately and clearly. Therefore it is the language used by engineers and architects to develop and record their ideas and to transmit them to those who are to execute their designs.

There are two basic types of drawings: artistic and technical. The artistic drawings are used to express the feelings, beliefs, philosophies, or abstract ideas of the artist. Technical drawing, on the other hand, is not subtle or abstract.

Drawing is used by engineers, technicians, and skilled craftsmen. Whether this drawing is made freehand (sketching) or by the use of drawing instruments (mechanical drawing), it is needed to convey all the necessary information to the individual who will fabricate and assemble the object be it a building, ship, aircraft, or mechanical device.

Today, the mechanics of the drafting task have largely been automated and accelerated through the use of Computer Aided Design and Drafting systems (CADD). Computer-aided design is the use of computer technology to aid in the design and particularly the drafting of a part or product, including entire buildings.

The student of technical drawing should attain a knowledge of fundamental principles presented in this text and as much skill as possible in drawing. To become a finished draftsman, he must also acquire knowledge of the details of construction employed in the branch of engineering sciences.