PDEM COMMUNICATION SKILLS

English

Imaginary Number

The mountain that remains when the universe is destroyed
is not big and is not small.
Big and small are

comparative categories, and to what
could the mountain that remains when the universe is destroyed
be compared?

Consciousness observes and is appeased.
The soul scrambles across the screes.
The soul,

like the square root of minus 1,
is an impossibility that has its uses.

Rereading

Remember that family who lived in a boat
run aground and capsized
by the creamy dunes where the plovers nest?
Sea, sun, storm, and firmament
kept their minds occupied.
David Copperfield came and went,
and their sympathy for him was such
that they pitied him almost as much
as he pitied himself. But their story
is not like the easy one
where you return to me and
lift my scarred eyes to the sun
and stroke my withered hand
and marry me, distorted as I am.
He was destined to dismantle their lives,
David Copperfield, with his
treacherous friend and insipid wives,
his well-thought-out position
on the Corn Laws and the constitution.
They were stillness and
he was all motion.
They lived in a boat upside down on the strand,
but he was of the kind who couldn't understand
that land was not just land
or ocean ocean.

Communication Skills Notes (1)

Unit 5 - Technical Description

STRATEGIES FOR WRITING TECHNICAL DESCRIPTIONS, DEFINITIONS AND CLASSIFICATIONS

The ability for technical description, definition and classification is essential for writing reports, manuals, proposals and several other forms of technical writing. These forms of writing require concise communication demanding analytical ability and perception of relationships among ideas and objects.

As you are aware, there is a close interrelationship among these forms of technical writing. However, the strategies for writing them differ because the purposes for which they are written are not the same. When you describe a thing, its definition and classification would certainly be of help to you. Similarly, a proper description of a thing can lead to a good definition. Classification is often an intermediate strategy and is of assistance both in definition and description.

In order to use these strategies in writing about your work you should know what they are, how they differ, the kinds of details each requires, and how the ideas in them are assembled. Let us now take up these for discussion one by one.

Technical Description

If you asked to describe a thing, how would you go about it? Most probably you would try to express what you experience through your senses, i.e., what you see, hear, smell, feel or taste. Out of these the first plays a very important role. For example, if you are asked to describe a house, you may use the following visual details: form, shape, design; colour; parts or sections; size; materials; motion (moving parts such as doors, windows, etc.); and uses (storage, sleeping, studying, etc.).

In fact, when you complete a project, in your report you often have to describe also the machines and mechanisms with which you worked and the processes within a larger framework. Let us now examine the techniques of describing machines/mechanisms/processes.

Machine/Mechanisms

A machine is a working object; consequently you must show the reader not only what it is, but also what it does. Give him a general statement incorporating these two points to place the device in functional surroundings. You may have to describe the theory or principle upon which the machine is built. In general, you can assume that the specialist will be familiar with the principles of machines that are modifications of those already in use; that the background principles of radically new machines should be extensively explained; and that for the more general reader a discussion of theory should be omitted.

Unless you are describing an extremely simple machine; do not take up details before you have given a broad, overall description. It is easy for the reader to get misconceptions about size, shape, colour, and other physical characteristics.

Details should be described in a systematic manner according to some logical order. One possible order is by function; that is, the parts of a machine are described in the order in which they function when the machine is put in motion.

Sometimes an order of importance is more logical. Although a machine usually depends on all its parts, some of these may be more important than others because they represent new ideas put into practice, or because certain primary operations depend on them. Occasionally you will be faced with the fact that two or more parts operate at the same time. For any of these reasons, you may have to fall back on importance as a unifying principle.

A third logical order often used is spatial. The parts are descried as you come to them. This may be from left to right, top to bottom, inside to outside.

Here is an example: a description of a mechanism used on some automobiles.

THE QUICK-STOP ANTI-SKID BRAKE SYSTEM

The Quick-Stop anti-skid automobile brake system is a wheel deceleration-sensing and compensation system that prevents wheel lock-up by alternately applying and releasing the brakes. Experiments show that the highest retarding friction between tire and road is obtained when slip is about 15 percent. The Quick-Stop system maintains slip within close limits on each side of this value.

The system has three basic elements:

(1) the sensors, which monitor the velocity and deceleration of the wheels;

(2) the electronic module, which processes this information into a usable signal; and

(3) the actuator, which modulates the hydraulic pressure supplied to the brakes.

The sensor consists of a toothed ring rotating with the wheel, a static toothed ring, magnets, and a coil. When the teeth of the two rings are in coincidence, flux induces a sinusoidal voltage output from the coil whose frequency is proportional to wheel speed.

The electronic module receives this signal and counts the pulses much as a frequency meter does. The signal is amplified in the module and sent to the actuator.

When an appropriate signal reaches the actuator, a solenoid opens an air valve, admitting atmosphere to one side of a vacuum-and-spring-suspended motor and causing the diaphragm to compress the spring. A piston in the hydraulic system retracts, closing a

check valve and isolating the wheel cylinder from the master cylinder. Further travel of the piston withdraws fluid from the wheel cylinder, reducing pressure. When a re-apply command is received, the solenoid closes off the atmosphere and reopens the vacuum source, causing the diaphragm and piston to return to normal. That re-establishes connection between master cylinder and wheel cylinder, so that hydraulic pressure is again applied to the wheel cylinder.

Processes

It is difficult to imagine a process that does not involve a machine or device of some kind. Therefore, what has already been said about describing a machine applies to processes. The major difference, however, between describing a machine and a process is that with a machine the emphasis is on the object that does the work, whereas with a process the emphasis is on the work itself. You must, therefore, take special care to see that the steps in a process are carefully explained and arranged. Your material will determine your method. As with machines, you can use an arrangement based on function, importance, or space, or combination of these.

Sometime there are several ways of carrying out the same process, especially with natural phenomena. Soil erosion will produce the same result, but the process in one locality may be quite different from that in another. In your description whether there are variations to the basic process. If so, they should be described. And it will clarify your writing if you end with a complete description of the product obtained or any other end result of the process.

The following procedure is part of a larger process. It should give you some idea of the steps involved in describing how a certain result is arrived at.

PREPARATION OF METAL PARTS FOR DRY-FILM LUBRICATION

Dry-film lubrication is an efficient method for lubricating metal parts. Dry-film lubricants are mixtures of lead, tin, and either graphite or molybdenum disulfide suspended in a thermosetting resin binder and sprayed on the parts to be lubricated. The binder is usually a vinyl chloride-vinyl acetate resin combined with a thermosetting-phenolic.

At present two types of dry-film lubricants are being used. Electro-film No. 6281 and Electro film No. 3849. The final use of the part to be sprayed determines the type of lubricant to be applied.

Before metal parts can be dry-film lubricated, they must be subjected to a surface preparation involving a cleaner and several baths.

The following procedure is used:

1. Cleaning

The metal parts to be worked are immersed in the emulsion cleaner at room temperature. The cleaner is an emulsifiable solvent, Enthose 75. It is used as furnished and is not mixed with water. Light oils are immediately penetrated and work can be withdrawn in a few seconds.

Heavier oil films and dirt contamination require longer soaking time.

After the parts are drained, they are thoroughly rinsed with water and are then ready for a pickle bath.

2. Pickle Bath

The pickle bath is used to dissolve rust scale rapidly and efficiently without attacking the exposed steel surfaces. This bath consists of Okite Compound 32, cut 50% with water.

After being put in the pickle bath, the parts are rinsed before immersion in the pre-phosphate bath.

3. Pre-Phosphate Bath

Any contamination remaining after the completion of the cleaning and pickle cycle is removed in the pre-phosphate bath. The pre-phosphate bath is prepared by adding 100 cc of cp concentrated nitric acid to 100 gallons of 85% phosphoric acid. The immersion will decrease the time in the phosphate bath.

The parts are again rinsed thoroughly and are ready for the next step.

4. Parcolene Z Bath

Parcolene Z chemical is used as a conditioner to promote the formation of a dense and finely crystalline phosphate coating. The conditioning solution is prepared by adding 8.5 pounds of the chemical to 100 gallons of water.

In this step, the parts are treated with Parcolene Z chemical for 10-60 seconds at room temperature. The bath must be agitated to prevent setting of active ingredients.

After the conditioning, the parts go directly into the phosphate solution without a water rinse.

5. Phosphate Bath

The parts go into a phosphate bath to create a complex zinc phosphate coating. The batch is a 2½% solution of Cripcot HC in water, operated at a temperature of 180-200F.

After the bath, the metal parts are given a hot-water rinse and dried immediately. They should be sprayed with dry-film lubricant as soon as possible to prevent absorption of moisture from the atmosphere.

Variations in Description

As with all kinds of writing the style and complexity of technical description depends on the reader for whom you are writing. Therefore, you may have to consider variations in the techniques we have already suggested.

In describing a machine for a layman, for example, it may be desirable to start out by explaining the ways in which the machine affects him. He may be interested in efficiency, in the newness of the device, or in its uniqueness. In other words, be particularly strong in reader motivation and personal appeal.

For such a reader, we should like to stress again the use of analogy. Analogy is an informal type of definition, using comparison and contrast, we recall reading an article on aircraft hydraulic systems in which, to quote the author, " The unloading valve in the pump acts like a policeman directing traffic." And in another place the author says: "In a basic hydraulic system it should be remembered that the pump is the most important part, just as the heart is the most important part of the human system."

For the layman, you may have to use dramatization and incident. The description of a process in celestial navigation was most effectively pointed out by taking an imaginary character, John Doe, through the ordeal of being set adrift in mid-ocean and showing how he put to practical use his knowledge of celestial navigation.

Suggested Outlines

The outlines below sum up our suggestions for basic descriptions of machines and processes.

Machines

- Nature and Function.
- Theories and General Principles.
- General Description.
- Specific Description.

  by order of function.
  by order of importance.
  by order of spatial arrangement.

Processes

- Nature and Function.
- Theories and General Principles.
- Materials and Machines Involved.
- General Procedure.
- Detailed Steps in the Process.
- Variations in the Process.
- End Result.

Exercise I: Describe a machine or a process with which you are familiar. Check your description with the points we have discussed above.

Technical description is an indispensable part of almost all kinds of writing.

Definitions

In your day-to-day work you keep on defining objects and ideas, consciously or unconsciously. In general, whenever you tell what something is or what it means, you are defining. You can succeed in informing or persuading someone when you both agree on what your words and ideas mean. Basically a definition consists of three main parts, namely, the term, classification and differentiation. The term is a word or a combination of words having a precisely limited meaning in the context in which it is used. Classification refers to the class to which the item represented by the term belongs. Differentiation shows how the word or idea is different from the others in its class.

The following example will illustrate what we are trying to say here:

Term	Class	Differentiation
lapidary	a person	who cuts, polishes, or engraves gems.
keystone	a central wedge shaped stone in an arch.	that locks the stones together.
digitalis	a drug	used as a heart stimulant.

Adherence to the following rules will help you define a word or object.

Avoid using terms that need to be defined. Use simple terms when they serve adequately.

Make certain that your definition is complete from the reader's point of view.

Avoid abstract words whenever possible.

Tell what it is not. This technique cannot however give a complete definition.

Set arbitrary limits. This technique is specially useful in defining conceptual terms that lack physical characteristics.

State the origin, cause or effect. This technique can best be employed in defining terms such as radioactivity, health beauty, electricity, etc.

Exercise II: Collect the definitions of five objects or terms related to your field of work and critically examine them in the light of the above discussion.

Definition and problem solution are closely related. Many problems can be solved in whole or in part by a thorough definition.

Classification

Almost everything that we do requires some kind of classification. In fact, we spend a large part of each day classifying things around us. This is true of the work that we do relating to our profession. Technical reporting requires orderly presentation of ideas, and classification is one of the basic ways in bringing about this orderliness in our presentation. When we do this it becomes easier to note relationship that exist among the ideas and opinions expressed.

In technical communication one of the methods that you might have used is what is called logical division. You might, for example write, "Tractor engines can in general be classified as full diesel, modified diesel and petrol." These can also be termed as classification. As you know classification is a useful. However, ensure that the relationship among the things classified is significant.

Now we suggest four "rules" of presenting a classification. These would, we believe, help you whenever you have to present related facts.

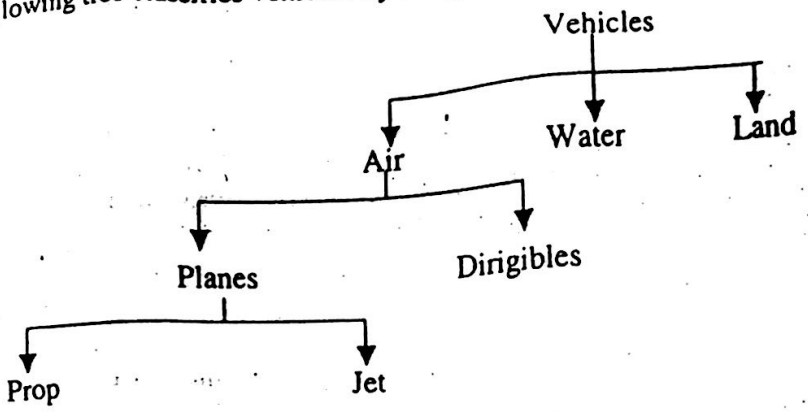
1. State the exact name of what you are classifying. If you think it necessary, define the thing you are classifying.

2. Clearly identify the basis for your classification, your standards, if necessary. Sometimes the name of the classes imply the standards, as when cars are classified by size, midgets, compacts, intermediates, etc.

3. Give the names of the classes into which you are sorting your subjects.

4. Briefly discuss the items placed in each class.

The following tree classifies vehicles by sorting them out into sub-classes.



As you may be aware, there are three general types of standards, namely, structural, functional and causal.

- Structural standards classify something by its components, design and other physical features.
- Functional standards classify something by how it works, what it does, or how it does it.
- Causal standards classify something by the kinds of causes or reasons that explain why it exists or happens.

To illustrate classification based on the above-mentioned standards, an example of each type is given below:

Example I (Structural Standards)

Automobiles (term) fall into one of three classes depending upon their dimensions (standard): small intermediate, and large (classes). The small car ranges in length from 112 to 157 inches and weight from 1300 to 2500 pounds. Usually it is powered by a four-cylinder engine. The intermediate car ranges in length from 203 to 210 inches and weights anywhere between 3,500 and 4,000 pounds. It is often equipped with a six-cylinder engine. The large car varies in length from 225 to 230 inches. Its weight ranges from 4,500 to 5,500 pounds. It requires a large power source, an engine ranging from 300 to 420 horsepower.

Example II (Functional Standards)

A drill bit has a working end that makes holes and a smooth that is grasped by the jaws of a chuck. While bits can be bought individually, they cost less if purchased in sets.

The twist bit, the most commonly used, cuts cylindrical holes. It has a sharp point and two spiral-shaped cutting edges that lift chips out of the hole as the turns.

Carbon steel twist bits are suited to drilling wood and soft metals; high-speed steel bits cut wood, soft metals, and mild steel; tungsten carbide or carbide-tipped bits cut hard metals and masonry. Cutting diameters commonly available range from one-sixteenth to one-half inch.

Example III (Causal Standards)

Desert bighorn competitors that cause a decrease in the number of surviving sheep fall into three groups, depending upon the amount of food and water each uses up. These are: natural competitors, introduced competitors and man. Rabbits, rodents, and deer are examples of natural competitors, eating the same foods the big horns eat.

Generally, deer competition is not excessive, but where it exists it most often occurs in the vicinity of water. Completion from introduced animals is much more important and serious. Included in this class are cattle, sheep, wild goats, burrows, and horses. The livestock often concentrate near water sources with resultant over use of forage in the area. These introduced competitors are often related to human encroachment. Farms, roads, fences, dwellings and recreational areas usurp bighorn habitat.

Example III: Now you from your working environment select three objects, mechanisms or devices and write their classifications using structural, functional or causal standard.

The sample description of Computer and Lathe machine is as follows:

5. Technical Descriptions:

Computer

(i) WHAT IS A COMPUTER?

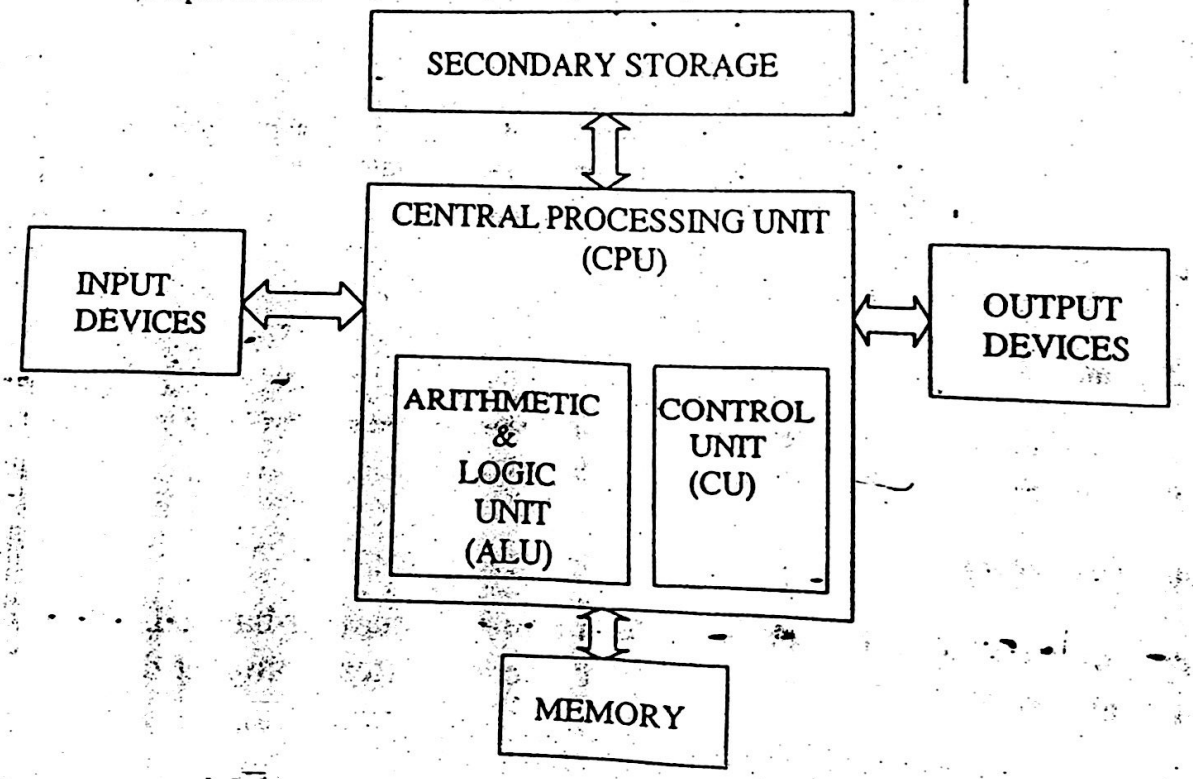
The computer is a computing machine, which operates at high speed and large accuracy. Its most fundamental function consists of performing certain operations on the basis of a sequence of commands and instructions. In short, a computer reads and stores input data, processes them and gives output results.

BASIC STRUCTURE

The computer consists of electronic components like Integrated Circuits (IC's) resistors, transistors, capacitors, and so forth. These components aid in performing functions such as input and output; text manipulation and calculation; logic and comparison; storage and retrieval.

On the basis of its functions, the computer system can be divided into four parts as shown in the block

- Central Processing Unit (CPU)
- Memory
- Input devices
- Output devices



THE CENTRAL PROCESSING UNIT (CPU)

The CPU constitutes the primary and most important part of a computer. It is an integrated circuit chip, which monitors the action and working of the rest of the system through the use of its electronic circuitry.

It comprises two main units:

- Control Unit (CU)
- Arithmetic and Logic Unit (ALU)

THE CONTROL UNIT (CU)

The CU analyses each instruction sequentially, obtains the necessary data from the memory and instructs the ALU to execute the task. The control unit is thus the centre for communication. It channels data and instructions to their required destinations. It communicates directly with the ALU, the memory, input and output devices.

THE ARITHMETIC AND LOGIC UNIT (ALU)

The ALU is thus the main site for computation and logical comparison. The result is then sent across to the output device through the CU. Thus, the completion and execution of an instruction is carried out by the ALU.

THE MEMORY

The term 'memory' implies data storage. Data is stored in the form of bits and byte which is the only language a computer can understand. It consists of two units:

- Primary.memory
- Secondary/Auxiliary memory

Primary Memory

This is the main memory of a computer and it is volatile. The inputted data are retained only as long as the power supply is available to the computer.

The Secondary Memory

Auxiliary storage is used to store data on a more permanent basis. This is done using disc storage. Example: Hard disc, diskettes, compact disc etc.

INPUT DEVICES:

Data is read into the memory using an input device. Some of the most commonly used input devices are:

(i) **Keyboard:** This is similar to that of a typewriter. It may consist of rows of toggle switches or light buttons that have touch response. Data can be fed in the form of alphabets, and other special characters.

(ii) **Mouse:** The mouse is a device that rolls on a flat surface and is used to position the cursor on the screen. It can have up to 3 click-buttons. They are used to choose an option at the pointed location on the screen.

(iii) **Trackball:** This can be considered to be mouse, in the sense; the rolling ball is on the upper surface. This is most commonly used in laptop computers.

(iv) **Touch Screens:** This input device is present on the monitor. Options can be Specified by simply touching corresponding points on the screen.

(v) **Scanner:** Written material and images on paper are converted to data recognized by the computer using a scanner.

(vi) **Voice Input:** These are speech recognition devices. The voice converted to binary code, which is then interpreted by the system.

(vii) **Networking:** With the advent of information explosion, the need to link several computers have cropped up. This method of communication is called networking. It could be local (LAN – Local Area Network) or global (WAN - Wide Area Network). Thus the data transfer from one computer to another becomes an important form of input.

OUTPUT DEVICES:

These devices are used to display the results of an instructed operation.

(i) **The Visual Display Unit (VDU):** The VDU is nothing but the monitor of a computer. Normally, the combination of a keyboard for an input device and a VDU for an output device is called a terminal.

(ii) **Printers:** These are used for obtaining results on paper. This is done to have a permanent record. Some of the different printers are the dot-matrix printer, the inkjet printer, the laser printer etc.

(iii) **Voice Output:** Speech synthesizers are now available to convert binary data into comprehensive vocalized sounds through speakers.

Lathe Machine

1. INTRODUCTION:

The oldest, most basic, most versatile, and most widely used of all the machine tools is the lathe and it is no wonder that it is termed as the 'Mother of machine tools'. The lathe is a machine tool, which is used for producing work pieces with cylindrical machined surfaces. It can also produce flat surfaces and holes. With the help of special attachments, threads and grooves can also be cut.

The following part gives a technical description of this indispensable machine tool.

2. COMPONENTS OF A LATHE:

The different parts in a simple lathe machine are clearly shown in the schematic diagram alongside (Fig.5.1). The different parts and their functions are described below:

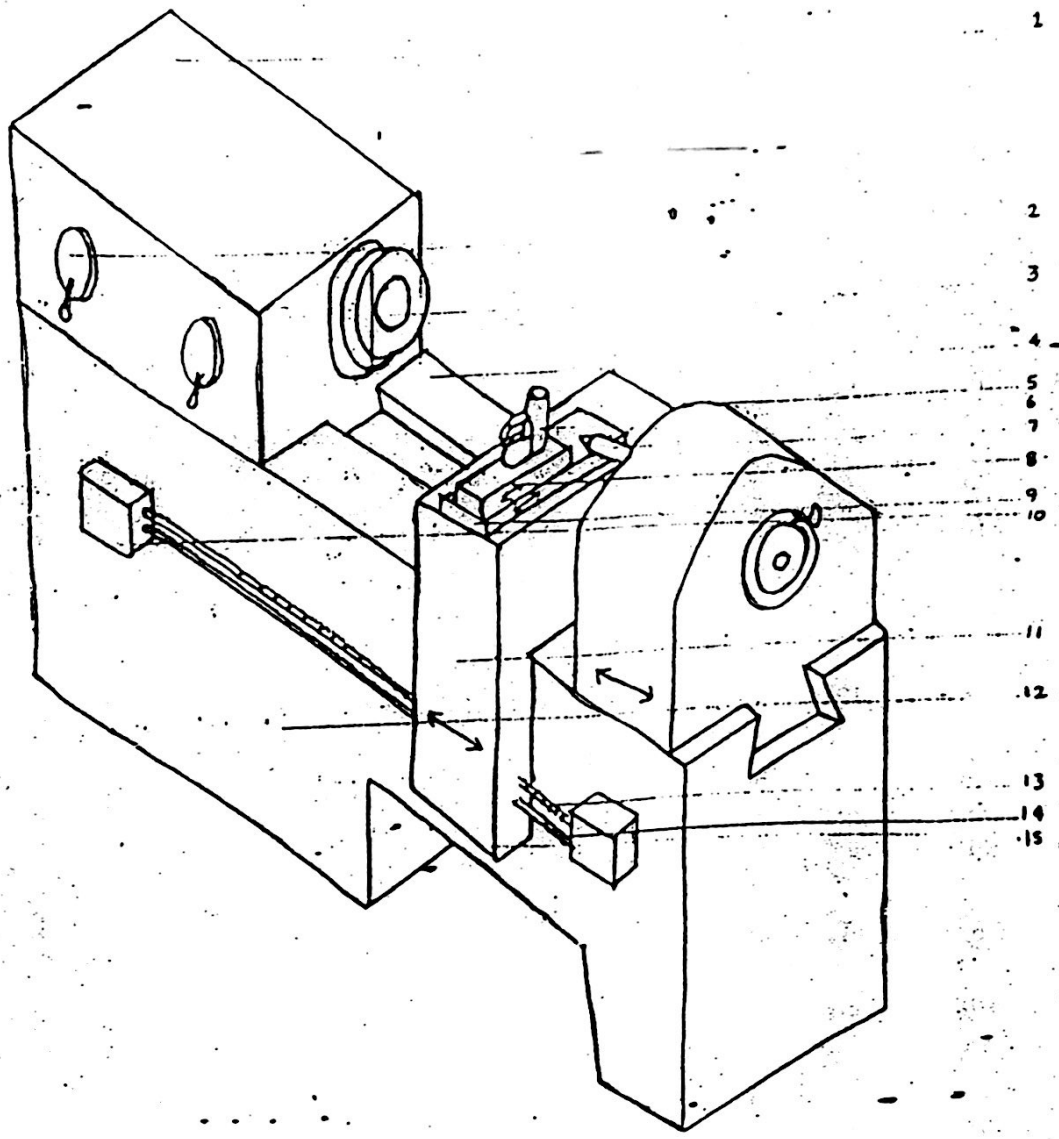


Figure 5.1- Schematic diagram of a lathe showing its different parts

KEY

1. Headstock
2. Spindle speed selector
3. Spindle
4. Guide way
5. Tailstock
6. Tool post
7. Tailstock quill
8. Compound rest & slide
9. Cross slide
10. Feed change gearbox
11. Carriage
12. Bed
13. Lead screw
14. Feed rod
15. Apron

2.1 Bed:

The bed is the base of the lathe and it supports all the other major components of the lathe. They may range from 3 to over 75 feet in length, and may be arranged either horizontally or vertically. They have large mass and are made of gray cast iron to resist deflection and absorb vibrations generated during operation.

2.2 Guideways:

The top of the bed has two guide ways (slide ways) to provide support and sliding surfaces for the carriage and tailstock (both of which are described later). They restrict the movements to a straight-line direction and have a V- section. These ways are hardened to make them wear resistant and are machined accurately to give dimensional accuracy.

2.1 **Headstock:** The headstock is secured permanently at the left hand end of the lathe bed. It consists of the following components:

2.1.1 **Spindle:** The headstock houses and supports the spindle and also the power driving mechanisms for it. The speed can be set through the spindle speed selector. It is hollow so as to facilitate the holding of long work pieces and their rotation. Since rigidity is of utmost importance, it is supported on excellent bearings, which keep all radial and axial movements to a minimum. Work holding devices such as chucks, centers and collets can be attached to the inner end.

2.1.2 **Spindle speed selector:** The spindle speed selector is a circular knob, which is located on the headstock face, which faces the worker. Its function is to set the speed of the spindle.

2.2 **Tailstock:** The tailstock is located at the right hand end of the bed. It can be moved along the guide ways and can be clamped in any position on the bed. It is also termed as 'loose headstock'. Its function is to hold the dead center and to support long work pieces during machining. It further consists of the following component:

2.2.1 **Quill:** It is a sliding cylindrical member and is sometimes termed as the 'tailstock Spindle'. However, it cannot rotate. The dead center, drills and reamers can be fixed into it and their movements controlled with the help of a hand wheel.

2.2.2 **Carriage:** The carriage slides along the guide ways between the headstock and Tailstock. Its function is to hold the cutting tool and move it to give longitudinal and/or cross feed to it. The carriage is actually an assembly of the following Components:

2.2.3 **Cross-slide:** It is mounted on the carriage and moves perpendicular to the spindle's rotational axis, i.e., it moves radially in and out, thus controlling the radial position of the cutting tool. The screw used for moving the cross slide has a micrometer dial.

2.2.4 **Tool post:** It is the actual component to which the cutting tool is attached. It needs to be rigid and strong to withstand the forces during operation.

2.2.5 **Compound rest:** It is also called the compound slide and is mounted on the top of the cross slide. It has a circular base graduated in degrees. On top of the compound rest lies the tool post. The compound rest swivels the tool for positioning and adjustment. It is also used for obtaining angular cuts and short tapers.

2.2.6 **Apron:** It is equipped with mechanisms for both manual and mechanised movements of the carriage and cross slide, by means of a lead screw and feed rod.

2.2.7 **Feed rod and lead screw:** The feed rod is powered by a set of gears from the headstock. It rotates during the lathe operation and provides mechanized movement to the carriage or the cross slide by means of gears, a friction clutch, and a keyway along the length of the feed rod.

The lead screw is also powered by gears from the headstock and provides specific accurate mechanized movement to the carriage for cutting threads on the work piece. The lead screw and the carriage are engaged by a split nut on the apron.