

2. INTRODUCING YOUR BRANCH OF ENGINEERING

UNIT 2. 1. Machining (MT-1, 2, 3)

Exercise 1. Read and translate the text.

Machining is the use of machines to cut pieces of materials, called workpieces and shape them into components. The tools are used in machining to make holes, grooves, threads, etc. So a machine tool is any power-driven mostly non-portable machine designed primarily for shaping and sizing metal parts by the progressive removal of chips or by abrasion, from raw materials in the form of castings, forgings, bars, tubes, plates and stamping.

In manufacturing, machining is usually guided by computer numerical control (CNC) systems. Often, design information (on shapes and sizes of components) is fed directly into CNC systems from computer aided design/computer aided manufacturing (CAD/CAM) software. The most common machining techniques which cutting tools use are: milling, turning, sawing, drilling and grinding.

Milling is cutting done by a milling machine, often using toothed cutting disks. When a workpiece is milled, it is held in a fixed position on the machine, and is shaped by cutting tools which rotate while being moved over the surface of the workpiece.

Turning is a technique for cutting components that have a circular cross-section. The workpiece is turned by a machine called a lathe, which rotates the workpiece.

Sawing is cutting using a blade which has teeth to remove a thickness of material slightly wider than the blade. The gap left by the blade, along the line of the cut, is called a kerf. Saws may also use abrasive wheels - that is, thin, circular cutting wheels with rough, hard surfaces often made of industrial diamond.

Drilling is a technique for cutting circular holes. A machine called a drill is fitted with a tool called a drill bit (or bit). The bit rotates and drills into the material. Usually, drilling refers to making new holes. In machining, enlarging a hole is called boring.

Grinding is removing material across a surface area, using abrasive wheels. The machines used to grind materials with abrasive wheels are called grinders. Machine tools are the backbone of the metalworking industry without which no other machines could be made. They are the only manmade objects capable of reproducing themselves.