Перекласти тексти українською мовою письмово.

Cutting Tools

An intermediate cutting alloy is Stellite, an alloy of cobalt, chromium, tungsten and carbon, which in cutting properties lies somewhere between the best high-speed steels and the carbide tools.

Diamonds, extensively used as cutting tools, are particularly suitable for the mass production of parts with great accuracy to dimensions, and where an extremely good surface is needed.

The standard cutting tool shapes are facing tools, roughing tools, finishing tools, left hand cutting tools and other specially shaped cutting tools.

Facing tools are ground to provide clearance with a center. Roughing tools have a small side relief angle to leave more material to support the cutting edge during deep cuts.

Finishing tools have a more rounded nose to provide a finer finish. Round nose tools are for lighter turning. They have no back or side rake to permit cutting in either diitection.

Left hand cutting tools are designed to cut best when traveling from left to right.

Aluminum is cut best by specially shaped cutting tools with the cutting edge slightly above center to reduce chatter.

"Mechanical Properties of Materials"

Density (specific weight) is the **amount** of mass in a unit volume. It is measured in kilograms per cubic metre. The density of water is 1000 kg/ m3 but most materials have a higher density and **sink** in water. Aluminium alloys, with typical densities around 2800 kg/ m3 are considerably less dense than steels, which have typical densities around 7800 kg/ m3. Density is important in any **application** where the material must not be heavy.

Stiffness (rigidity) is a measure of the resistance to deformation such as stretching or bending. The **Young modulus** is a measure of the resistance to simple stretching or compression. It is the ratio of the applied force per unit area **(stress)** to the fractional elastic deformation **(strain).** Stiffness is important when a **rigid** structure is to be made.

Strength is the force per unit area (stress) that a material can support without failing. The units are the same as those of stiffness, MN/m2, but in this case the deformation is irreversible. The **yield strength** is the stress at which a material first deforms plastically. For a metal the yield strength may be less than the fracture strength, which is the stress at which it breaks. Many materials have a higher strength in compression than in tension.

"Mechanical Properties of Materials"

Ductility is the ability of a material to deform without breaking. One of the great advantages of metals is their **ability** to be formed into the shape that is needed, such as **car body** parts. Materials that are not ductile are **brittle.** Ductile materials can **absorb** energy by deformation but brittle materials cannot.

Toughness is the resistance of a. material to breaking when there is a **crack** in it. For a material of given toughness, the stress at which it will fail is inversely proportional to the **square root** of the size of the largest defect present. Toughness is different from strength: the toughest steels, for example, are different from the ones with highest **tensile strength.** Brittle materials have low toughness: glass can be broken along a chosen line by first scratching it with a diamond. Composites can be designed to have considerably greater toughness than their **constituent materials.** The example of a very tough composite is fiberglass that is very flexible and strong.

Creep resistance is the resistance to a **gradual permanent** change of shape, and it becomes especially important at higher temperatures. A successful research has been made in materials for machine parts that operate at high temperatures and under high tensile forces without gradually extending, for example the parts of plane engines.

Lathes

Lathe is an equipment for machining of metals. It was the earliest machine tool, driven by power, which can produce different forms in a metallic substance by continually repeated cuts. A primitive type was used in Ancient Syria. In this early machine the revolutions were alternately forward, for cutting, and backward. In the 14^{th} century the lathe driven by a wheel appeared. It is continuously developed in 16^{th}, 18^{th} centuries. And about 1800 there was the greatest inventions of history. Maudslay provided his lathe, having a slide-rest, with lead-screw and change-gears, and from then onward the development of the modern machine tool has been continuous and rapid. This combination is distinctly Maudslay's. (Henry Maudslay [1771-1831]).

Joseph Bramah [1748-1814] was responsible for many other inventions and in 1814 he made quite successful machines for sawing stone.

Joseph Clement developed the planing machine and the screw-cutting lathe.

When Maudslay and Clement were later in business for themselves, they took on probably the greatest toolmaker of the 19^{th} century – Joseph Whitworth [1802-1837], who had a greater influence on machine tools than any other engineer, because he was the first to invent a means of obtaining a true plane surface. Without this it would be impracticable to secure accuracy in the sense in which it is now understood.

Dr. Hooke first invented a milling machine about 1664.
The credit for introducing boring machines must be given to George Bodmer who designed the first type, which in essentials was identical with those of modern times.

As lathes in general are used for a great variety of operations, naturally there are many different designs and size. The various types are usually classified, either with respect to some characteristic constructional feature, or with reference to the general class of work for which the lathe was designed. The most common type of lathe is usually known by manufacturers as an engine lathe. The term "engine", as used in this connection, simply means a machine, and it serves to designate that particular class of lathe which is hand manipulated and used by machinists for general work. In ordinary shop usage, the word "lathe" is commonly used to indicate a lathe of this class. Lathes having gears which are changed for cutting threads of different pitch are sometimes known as plain or standard engine lathes, whereas those having a gear-box by means of which the necessary gear combination may be obtained by simply shifting one or two levers are usually known as the "quick change-gear" type. The tool-room or toolmaker's lathe is classified according to the general class of work for which the lathe is designed. It is similar appearance to an ordinary engine lathe, but has extra attachments and is generally considered a very accurate machine.
Other types of lathes which have some distinguishing characteristic are: The turret lathe, which is so named because tools for performing successive operations are held in a revolvable turret; the bench lathe, which is so small that it is mounted on a bench, and intended for delicate work usually requiring considerable accuracy; the crankshaft lathe, which is especially arranged for turning crankshafts; the speed lathe, which is without back-gears and is used for rotating parts rapidly for polishing, hand turning, or filing; the chucking lathe, which is especially adapted for parts that must be held in a chuck while being operated upon; and the automatic lathe, which is designed for duplicate production. So, many types of lathes are differed in their size, design, method of drive, arrangement of gears and purpose. There are also screw machines, boring miles, lapping machines, etc.