

STUDY ABOUT MACHINE OPERATIONS AND ITS DIFFERENT OPERATIONS

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ABSTRACT

A machine tool is a machine tool used to shape and grind metals or other materials, usually by cutting, drilling, grinding or shearing. There are cases where individual parts of a composite unit are completed in a series of processes that may include various cuts, grinding, plastic modification, heat treatment etc. In this we have explained about the machining and different machine tool like Grinding, Drilling, Shearing etc.

Keywords: Turning, Lathe, Milling, Shaper, Drilling.

I. INTRODUCTION

The development of machine tools for manufacturing is closely associated with the Industrial Revolution, marked by James Watt's successful development of the steam engine in 1776. When he began to design steam engines in 1763, his main challenge was to build cylinders. Drill precisely enough to prevent steam from escaping around the piston. The original cylinder was made of sheet metal, certainly not working properly. The problem was finally solved by John Wilkinson when he invented the horizontal water wheel reamer around 1775. This machine is often considered the first machine tool.

Machining is a general term describing a group of processes that include removing material and modifying the surface of a part after it has been manufactured by various methods. So machining includes secondary and finishing operations. The basic principle of all machining is to provide adequate relative movements between the tool and the workpiece to produce a characteristic geometry. The three main machining processes are classified into turning, drilling and milling.

Turning

Turning is a machining process in which a cutting tool, usually a non-rotating tool, describes a twisted toolpath by moving more or less linearly as the part rotates. The turning process generally involves rotating a part while a single point tool is moved parallel to the axis of rotation. The turning processes are typically carried out on a lathe, considered to be the oldest of machine tools.

Turning specific operations include:

1. Tapered turning
2. Spherical generation
3. Hard turning
4. Facing

Drilling and Milling

Drilling is the act of making a round hole by removing a mass of metal from a product with a cutting tool called a drill. A drill is a rotary head cutting tool with one or more cutting lips and usually one or more flutes for chip transfer and cutting fluid reception. A punch drill is a machine tool designed to drill holes in metal. It is one of the most versatile and important machine tools in the workshop.

This machine consists of following parts

- | | | |
|------------------|----------------|---------------|
| 1. Base | 2. Pillar | 3. Main drive |
| 4. Drill spindle | 5. Feed handle | 6. Work table |

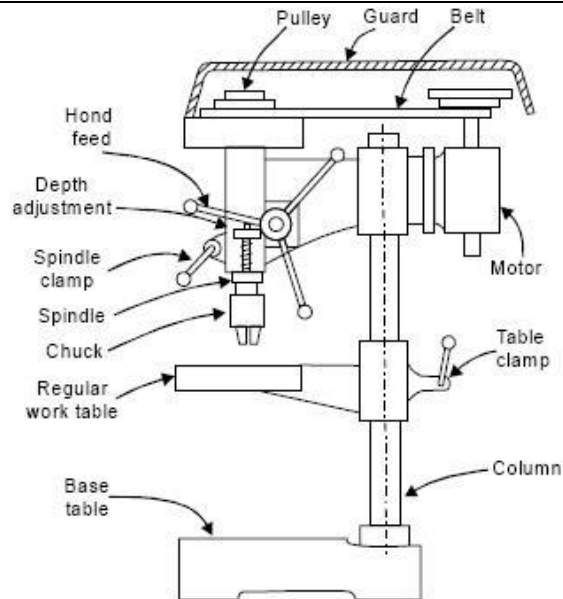


Figure 1: Diagram of Drilling Machine.

Milling is a machining process that uses a rotary cutter to remove material by passing a cutter through the workpiece. Milling covers a wide variety of operations and machines ranging from small individual parts to large group milling operations. It is one of the most widely used processes for machining custom parts to exact tolerances.

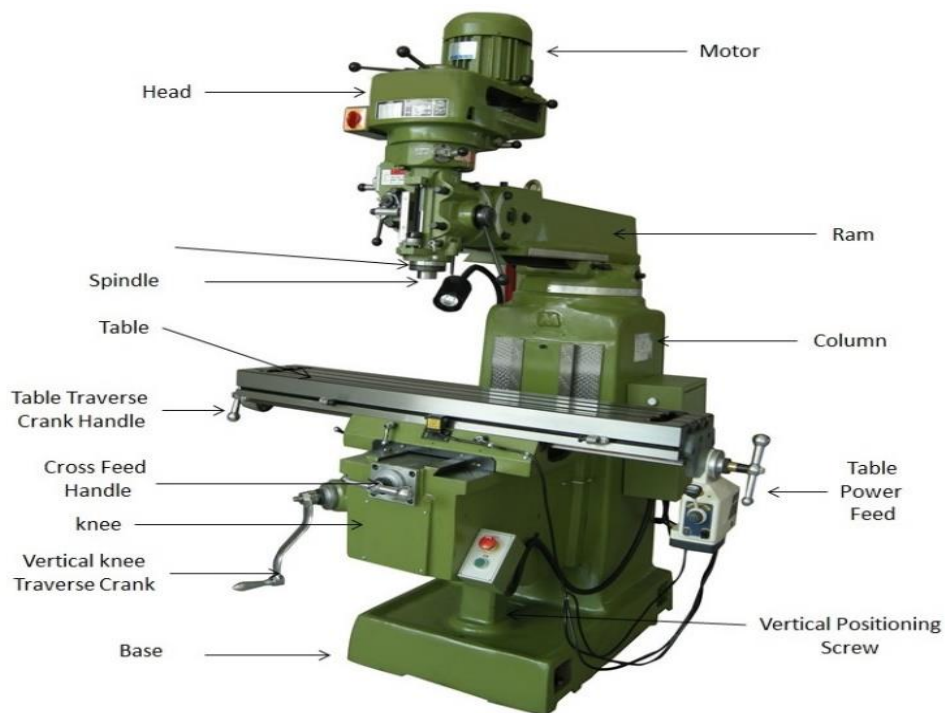


Figure 2: Diagram of Milling Machine.

II. RESULTS AND DISCUSSION

We have discussed the different types of machine operation by specially focusing in Turning, Grinding and milling. We found the different applications of these machine operations in different industries. As milling machine can hold single as well as multiple cutter while working at a same time, this become the reason of its importance in production work. Similarly, Turing machines find applications in complexity research and algorithmic information theory, software testing, high-performance computing, machine learning, software engineering, computer networks, and evolutionary computing.

III. CONCLUSION

Machining is the production of a material into a desired shape and size. Usually, machining refers to metal processing; however, it can also be used to refer to the production of wood, plastic, ceramic, stone and other materials. Machining is a necessary process for many industries, especially those related to construction and manufacturing. Because machining is so versatile and precise, it allows businesses and industries to design products and tools that meet their exacting needs.

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