

Conventional Machining Methods

TAPPING

SAWING

REAMING

SHAPING

PLANING

OUTLINE

- Methods of;
 - Sawing
 - Reaming
 - Tapping
 - Shapping
 - Planning
- Their history, their types , how do they work and their usage areas with advantages and disadvantages.

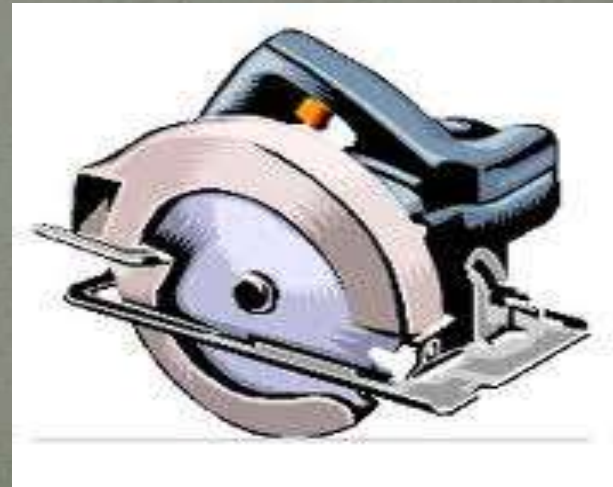
SAWING

History

- The early ancestors of modern humans, likely first used a jawbone of bovid animals as a saw.
- Until at least the mid-19th century, saws were made laboriously by hand.
- In 1926, the first saw which worked with electricity was invented by Andreas Stihl.
- In 1927, Emil Lerp invented a saw that works with using oil in Germany.
- In 1950, he invented first portable saw which has a motor.

SAW : Saw is a tool that uses a hard blade or wire with an abrasive edge to cut through softer materials.


- The cutting edge of a saw is either a serrated blade or an abrasive.
- A saw is classified with working by hand or powered .



Materials used for saws and advantages

Brass  low price

Steel  easy to shape

Diamond  superhard material

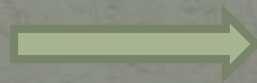
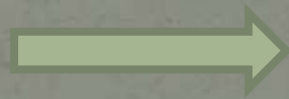
High Speed Steel (HSS)  high speed

Tungsten Carbide  straight cuts

Types of saws;

1. Hand saws

- Crosscut saws
- Rip saws
- Two-man saws
- Hacksaws



Disadvantage: Hand saws require more time.

2. Mechanically powered saws

2.a. Circular blade saws

- Cutting is by teeth on the edge of a thin blade
- The cut has narrow kerf and good surface finish
- Cuts are straight and relatively accurate
- The saw usually leaves burrs on the cut edge
- The most using type is called cold saw which using for sawing metals.



2.b. Continuous band saws



- Bandsaws are available in vertical and horizontal designs
- They are convenient to use for both timber and metal cutting.

REAMING

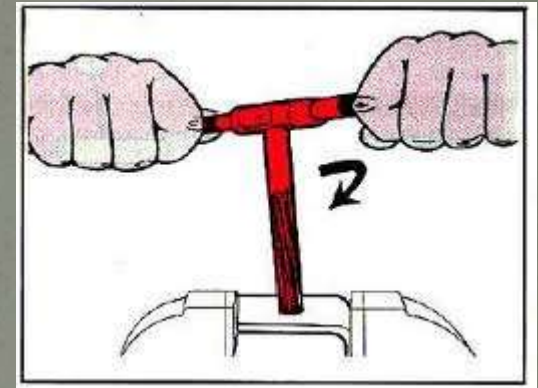
Reamer is a metalworking tool used to create an accurate sized hole. The process is called reaming.

- There are two classifications of reamers; machine and hand reamers.



Hand reamers

- A hand reamer has a longer taper at the front than a machine reamer. This is to compensate for the difficulty of starting a hole by hand power alone.
- It also allows the reamer to start straight and reduce the risk of breakage.



Machine reamers



- Used in any machine tool for both roughing and finishing hole.
- The constant cutting force that can be applied by the machine ensures that it starts cutting immediately.

- Tool materials

- Heat treated materials

- Hard materials

- Workpiece materials

- Aluminum and brass

- Lubrication

- Mineral oils, synthetic oils, and water soluble oils are used for lubrication and applied by flooding or spraying



TAPPING

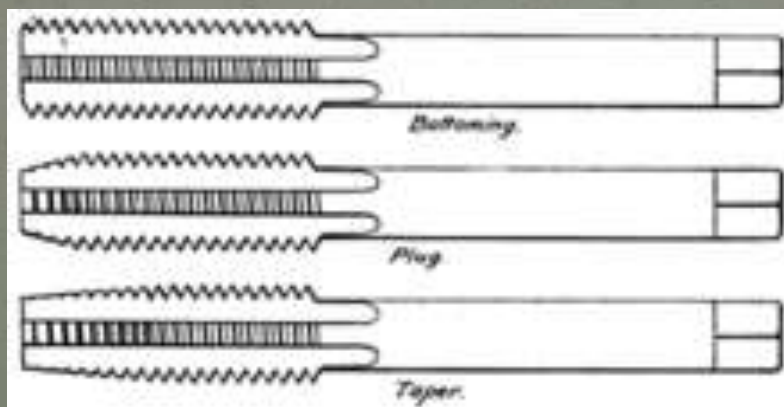
A *tap* cuts a thread on the inside surface of a hole, creating a female surface which functions like a nut.

➤ Tapping process can be classified as machine and hand tapping.



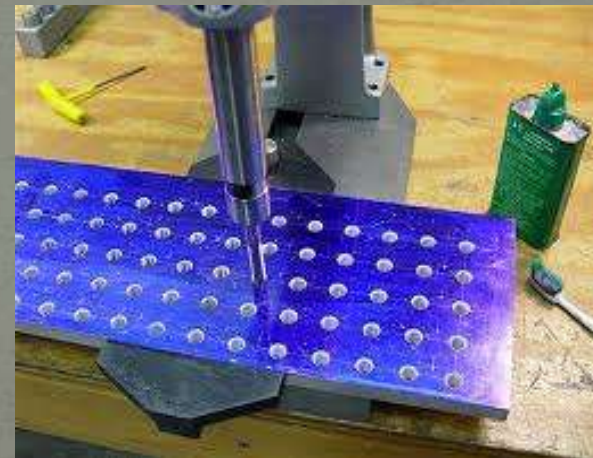
Hand Tapping

- The three taps in the image illustrate the basic types commonly used by most machinists. The illustrated taps are generally referred to as hand taps, since they are, by design, intended to be manually operated



Machine tapping

- Machine tapping is faster, and generally more accurate because human error is eliminated.



Advantage – Disadvantage

- Both reaming and tapping very important processes in conventional machining methods, because in any area for any material they are needed to apply.
- Tools that belongs to reaming and tapping processes are tend to breakage so machinists should behave carefully not to break tapers and reamers pieces in the hole.

SHAPING

History

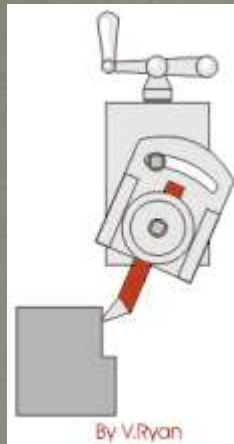
- James Nasmyth invented the shaper in 1836.
- Shapers were very common in industrial production from the mid-19th century through the mid-20th century.
- They are still popular in many machine shops such as jobbing shops, repair shops or tool and die shops.

A **shaper** is a type of machine tool that uses linear relative motion between the workpiece and a single-point cutting tool to machine a linear toolpath.

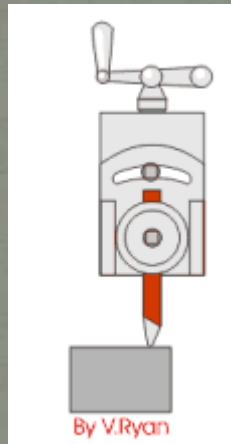
- Shapers are mainly classified as standard, draw-cut, horizontal, universal, vertical, geared, crank, hydraulic, contour and traveling head.
- Also small shapers have been successfully made to operate by hand power.



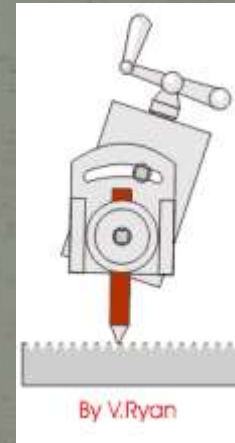
- As size increases, the mass of the machine and its the power requirements increase, and it becomes necessary to use a motor or other supply of mechanical power.
- A shaper operates by moving a hardened cutting tool backwards and forwards across the workpiece.



The tool post has been turned at an angle so that side of the material can be machined.



The tool post is not angled so that the tool can be used to level a surface.



The top slide is slowly feed into the material so that a 'rack' can be machined for a rack and pinion gear system.

Advantage – Disadvantage

- It is a popular machine in a workshop because its movement is very simple although it can produce a variety work .
- They are robust in construction.
- Making their repair and upkeep easily achievable.
- But in current industrial practice, with improving technologies, shapers have been largely replaced by other machine tools including milling machines, grinding machines and broaching machines.

PLANING

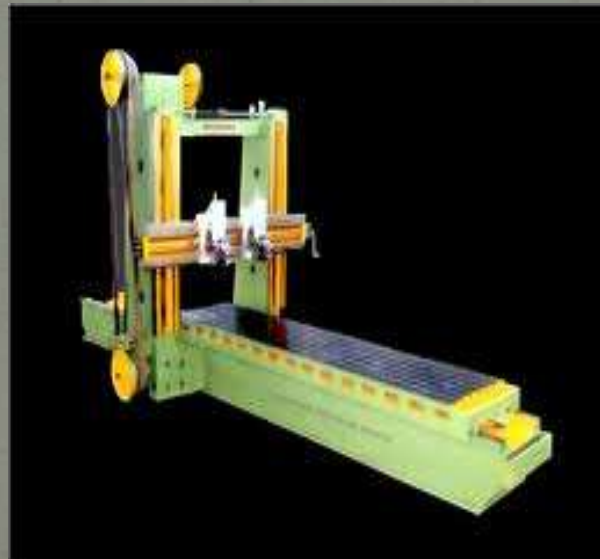
History

Early planing ideas are known in France ,1750s.
In the late 1810s, in British shops developed
the first planers.

But the exact development of planing
machine was undocumented .



Planing is a manufacturing process of material removal in which the workpiece reciprocates against a stationary single-point cutting tool and it produces plane or sculpted surface. Its process is known as a planer.



Planers are used for ;

- to produce horizontal, vertical or flat surfaces on workpieces usually too large for shaping.
- by smaller tool and die shops
- to maintain and repair large stamping dies
- plastic injection molds.
- large block of metal must be squared when a horizontal grinder or floor mill is unavailable.

"The most common material to be planed or shaped is wood but it is used from metal pieces to plastic object"

- There are two types of planers for metal:
Double housing and open-side.



- The double-housing variety has vertical supports on both sides of its long bed.
- The open-side variety has a vertical support on only one side, allowing the workpiece to extend beyond the bed

Planing is similar to shaping.

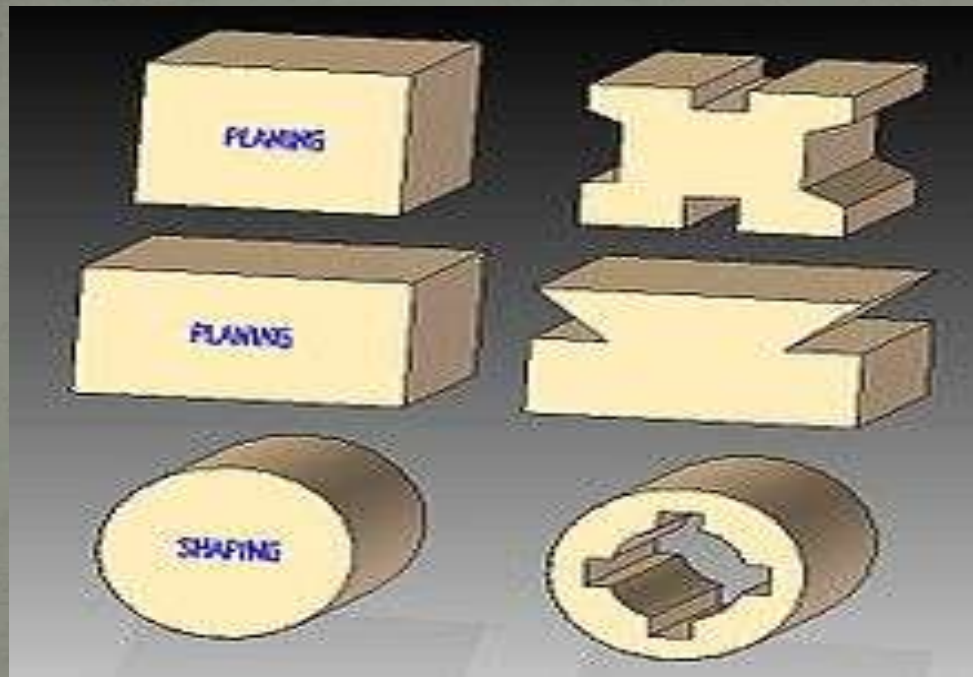
The main differences between these two processes are;

- In shaping method, the workpiece is usually smaller, and the tool moves, not the workpiece

&

- In planing method, horizontal, vertical, or inclined flat surfaces on workpieces too large for shaping are used.

Difference of shaping and planing



Advantage – Disadvantage

- Planing is old method
- Planers are now obsolescent, because other machine tools -*milling machines, grinding machines*- have eclipsed.
- Single-point cutting tools are more easily sharpened and fabricated..
- This method involves less danger to workmen.

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THANKS FOR YOUR ATTENTION

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