Unconventional Machining Process

The unconventional machining is also called as non-traditional machining.

The unconventional machining use for the machine the hard and brittle materials such as carbides, stainless steel, Hastelloy, nitralloy, wasalloy, and any other that cannot be machined by a conventional process using the conventional machines such as lathe, milling, shaper, planer etc.

These materials are widely used in the field of the nuclear industry, space research, missile technology and in other industries which requires high strength to weight ratio, heat-resisting quality, hardness and toughness.

By using the conventional machining the time taken for machining is more and the fewer surface finishes, as well as no accuracy. Therefore by using unconventional machining the time taken is less and the surface finish and accuracy are excellent.

The **unconventional machining** it uses some form of energy for metal removal there is no direct contact between the tool and workpiece. his process is also uneconomical, time-consuming and sometimes impossible to machine complex shapes.

Advantages of the unconventional machining process

It has a high degree of accuracy.

It provides a great surface finish.

The complex shapes can be easily machined.

It has higher tool life.

The metal removal rate is high.

Disadvantages of the unconventional machining process

This process has the higher cost.

It requires high operator skills.

It is complicated in setup.

Types of Unconventional Machining Process

The following are the Types of unconventional machining processes:

Mechanical energy based unconventional machining process

- Abrasive jet machining (AJM)
- Ultrasonic machining (USM)

Chemical energy based unconventional machining

- Chemical machining (CHM)

The electrochemical-based unconventional machining process

- Electro-chemical machining (ECM)
- Electrochemical grinding (ECG)

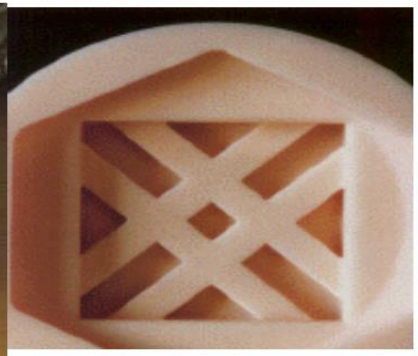
Thermo-electric energy based unconventional machining

- Ion-Beam machining (IBM)
- Plasma ARC machining (PAM)
- Electron-Beam machining (EBM)
- Laser-Beam machining (LBM)

Mechanical: Erosion of the work material by a high velocity stream of abrasives or fluids (or both)
Thermal: The thermal energy is applied to a very small portion of the work surface, causing that portion to be removed by fusion and/or vaporization of the material. The thermal energy is generated by conversion of electrical energy.

Electrochemical: Mechanism is reverse of electroplating.

Chemical: Most materials (metals particularly) are susceptible to chemical attack by certain acids or other etchants. In chemical machining, chemicals selectively remove material from portions of the workpart, while other portions of the surface are protected by a mask.



Mechanical Energy Based process

Material is removed by mechanical erosion of work piece material

– Abrasive Jet Machining (AJM)
– Water Jet Machining (WJM)
– Ultrasonic Machining (USM)