METAL CUTTING
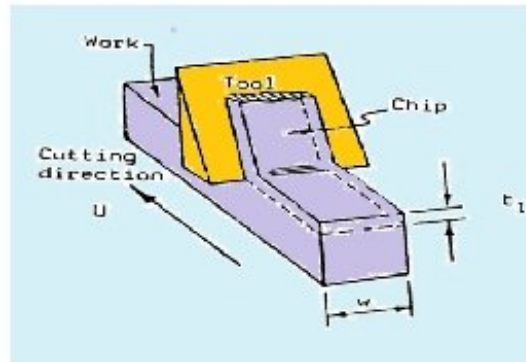
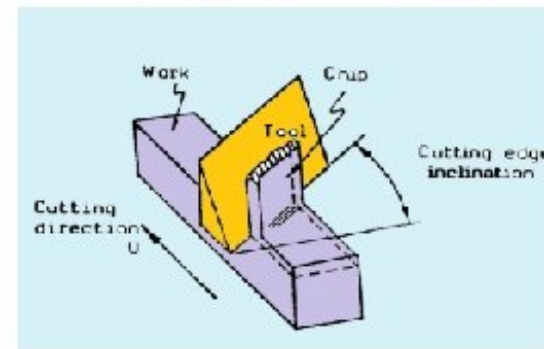**Metal Cutting is the process of removing unwanted material from the workpiece in the form of chips**

ORTHOGONAL CUTTING	OBLIQUE CUTTING

➤ Cutting Edge is normal to tool feed.

➤ Here only two force components are considered i.e. cutting force and thrust force. Hence known as two dimensional cutting.

➤ Shear force acts on smaller area.

➤ Cutting Edge is inclined at an acute angle to tool feed.

➤ Here three force components are considered i.e. cutting force, radial force and thrust force. Hence known as three dimensional cutting.

➤ Shear force acts on larger area.

S.No	Orthogonal Cutting	Oblique Cutting
1	The cutting angle of the tool makes a right angle to the direction of motion	The cutting angle of the tool does not make the right angle to the direction of motion
2	The flow of the chip is perpendicular to the cutting edge.	The flow of the chip is not perpendicular to the cutting edge.
3	The tool has lesser cuttings life	The tool has a higher cuttings life.
4	The shear forces per unit area is high, which increases the heat per unit area.	The shear force per unit area is low, which decreases heat per unit area.
5	In orthogonal cutting, the surface finish is poor.	In oblique cutting surface finish is good.
6	Cutting edge is longer than the edge of the cut	Cuttings may or may not be longer than the edge of the cut.
7	In orthogonal cuttings, only two components of force are considered cutting force and thrust force, which can be represented by a 2D coordinate system.	In oblique cutting, three components of force are considered, cutting force, thrust force, and radial force, which cannot represent by 2D coordinate. It used a 3D coordinate to represent the forces acting during cutting, so it is known as 3D cutting.
8	Two mutually perpendicular cutting forces act on the workpiece	Three mutually perpendicular forces are involved.

Orthogonal cutting

Oblique cutting

Chip

Chip