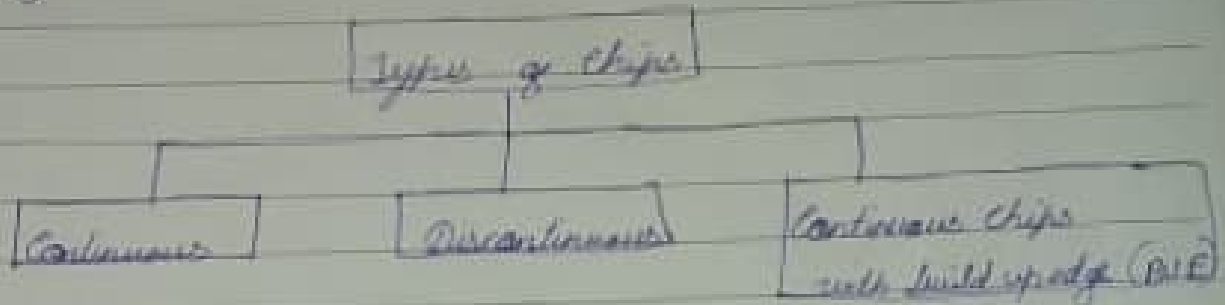




1. Study of Type of chips

The various types of chips in metal cutting are:



2. Continuous chips

If the metal chips formed during machining is without segments i.e. without breakage, then it is called as continuous type of chips.

Continuous chips are formed when the ductile material is machined with high cutting speed and minimum friction between the chips & tool face.

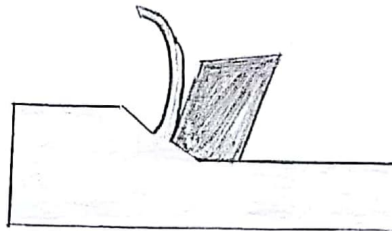


fig :- continuous chips

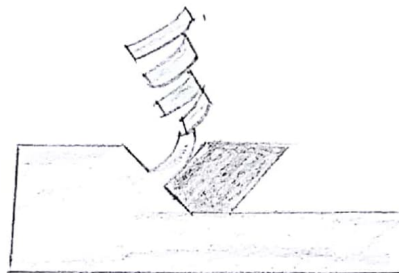


fig :- Dis-continuous chips

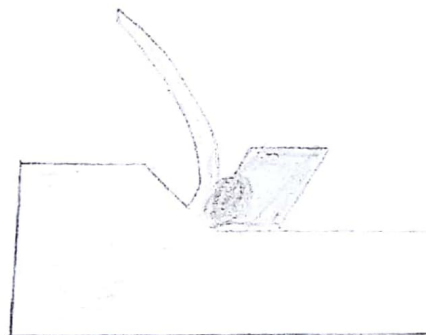


fig :- Built up Edge



Chhatrapati Shahu Maharaj Shikshan Sanstha's
CHH. SHAHU COLLEGE OF ENGINEERING
Kanchanwadi, Palthan Road, Aurangabad.

Date :

The conditions which are responsible for the formation of continuous types of chips are

- i) Ductile material like mild steel is used.
- ii) Ripping rake angle of the tool.
- iii) High cutting speed.
- iv) Minimum friction between the chip & tool interface.
- v) Small depth of cut.

Advantages

The formation of continuous chips during machining process has the following advantages.

- Better surface finish to the ductile material.
- Low heat generation due to minimum friction between the tool face and chip.
- Low power consumption.
- Long tool life due to less wear & tear.

2. Discontinuous chips

If the chips formed during machining process are not continuous i.e. formed with discontinuities called discontinuous chips.



Discontinuous types of chips are formed when hard and brittle metals like brass, bronze and cast iron is machined.

Conditions which are responsible for the formation of discontinuous chips are:

- i) Low feed rate.
- ii) small rake angle of the tool.
- iii) High cutting speed.
- iv) High friction forces at the chip tool interface.
- v) Too much depth of cut.

Advantages

The formation of discontinuous types of chips are brittle materials provides good surface finish, increases the tool life and reduces the consumption of power.

Disadvantages

When discontinuous chips are formed in the ductile materials, the workpiece result in poor surface finish and excessive wear & tear of the tool take place.



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Kanchanwadi, Palman Road, Aurangabad.

Date :

3. Continuous chips with Built up Edge.

Continuous chips with built up edge is formed by machining ductile material with high friction at the chip-tool interface. It is similar to the continuous type of chips but it is of less smoothness due to the built up edge, where the chip is flange in upward direction and high friction is exerted in between the interface of the chip and tool. Due to the high friction between the chip and tool a very intense heat is generated at the nose of the tool. The compressed metal adjacent to the tool nose gets welded to it. This compressed metal welded to the nose is called built up edge. When the chip flows through this built up edge, it gets broken and carried away by the chip and called as built up edge chips. The back of the built up edge is adhered to the surface of the workpiece and makes it rough. Due to formation of the built up edge the rake angle of the tool gets changed and it is in the cutting force.



The factors which are responsible for promoting the formation of the BUE chips are:

- (i) Excessive feed rate.
- (ii) Small rake angle of the tool.
- (iii) Low cutting speed.
- (iv) Lack of coolant and this increases the friction between the chip tool interface.

Advantages

The making of the BUE has one advantage i.e. it protects the tool from getting damaged from high friction and temperature generated during machining process and hence the tool life increases.

Disadvantages

The formation of these type of chips results in rough surface finish, change in the rake angle and cutting forces.