

## Sec. 4, ans 2 :- Extrusion :-

1. It is the process of confining metal in a closed cavity and then allowing it to flow from only one opening, so that the metal takes the shape of opening.
2. The operation is identical to the squeezing of toothpaste out of a toothpaste tube.

### Types of Extrusion :-

- a) Hot Extrusion :-
  - (i) It is carried out above the recrystallization temp.
  - (ii) It consists of pressing a metal inside a closed chamber its force is pushed out by high pressure through an orifice which is shaped to provide the desired form of the finished part.
  - (iii) Due to higher temp. involved, special equipment is needed and the wear rates are high.
  - (iv) The various methods of hot extrusion are :-
    - (i) Direct Extrusion
    - (ii) Indirect Extrusion
- b) Cold Extrusion :-
  - (i) It is carried out below the recrystallization temp. of metal being extruded.
  - (ii) It could also be direct or reverse but extrusion ratio is lower and extrusion pressure is higher than the hot extrusion.

3. Following are the various cold extrusion processes

- (i) Impact extrusion.
- (ii) Hydrostatic extrusion.

⇒ Defects of Extrusion are :-

1.) Internal Cracking :-

- 1) Cracks are developed in the centre of extruded materials.
- 2) These are hard to detect in the materials.
- 3) They are ~~also~~ also known as :-
  - (i) Centre Cracking
  - (ii) Centre Burst
  - (iii) Chevron Cracking
  - (iv) Arrow head Cracking

2. Surface Cracking :-

- 1) If the extrusion temp., extrusion speed & friction are too high, surface temp. rises significantly and can lead to surface cracking and flaking.
- 2) In hot extrusion, this form of cracking usually is intergranular and is associated with high temp.

### 3) Piping Defect :-

1) It occurs during hot ~~enter~~ extrusion due to presence of impurities & oxides.

2) It is also known as :-

(i) Tail pipe

(ii) fish Tailing