

CLASSIFICATION OF FORGING PROCESSES BASED ON ARRANGEMENT OF DIES

1. **Open Die Forging:** Flat dies of simple shape are used.

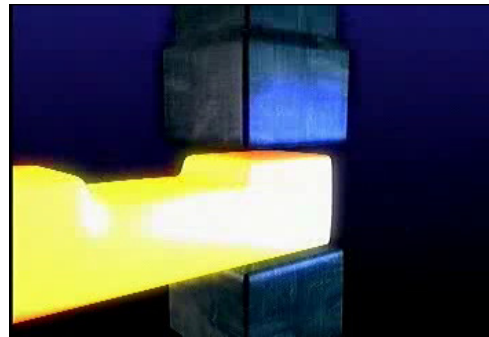
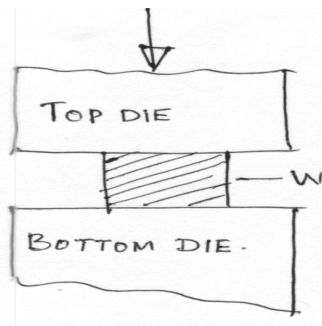


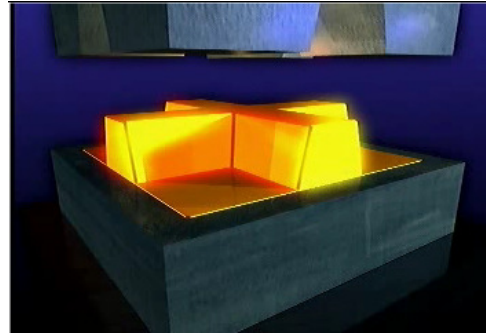
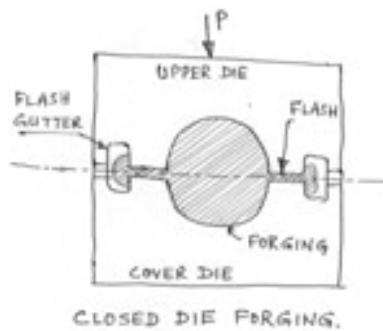
Fig. Open Die Forging

Features of open die forging:

- Repeated impact blows are given on the work
- Less dimensional accuracy
- Suitable only for simple shapes of work
- Requires more skill of the operator
- Usually used for a work before subjecting it to closed die forging (to give approximate shape)
- Dies are simple and less expensive
- It can be analyzed much easily
- It is the simplest of all forging operations

2. Closed Die Forging:

Work piece is deformed between two dies with impressions (cavities) of the desired final shape on them.



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Fig. Closed Die Forging

Features of Closed Die Forging:

Closed die forging involves two or more steps:

- **i) Blocking Die:** Work is rough forged, close to final shape.
- **ii) Finishing Die:** work is forged to final shape and dimensions.
- Both Blocking Die and Finishing Die are machined into the same die block.
- More number of dies are required depending on the complexity of the job.
- Two die halves close-in & work is deformed under high pressure.
- High dimensional accuracy / close control on tolerances.
- Suitable for complex shapes.
- Dies are complex and more expensive.
- Large production rates are necessary to justify high costs.

Significance of Flash in Closed Die Forging:

- Excess metal is taken initially to ensure that die is completely filled with metal to avoid any voids.
- Excess metal is squeezed out of the die cavity as a thin strip of metal, called flash.
- A flash gutter is provided to reduce the area of flash.
 - Thin flash increases the flow resistance of the system & builds up the pressure to high values which ensures that all intricate shapes of cavity are filled.
 - Flash design is very critical and important step in closed die forging.
 - Extremely thin flash results in very high pressure build up which may lead to breaking of the dies.