23ME715 : FABRICATION PROCESS

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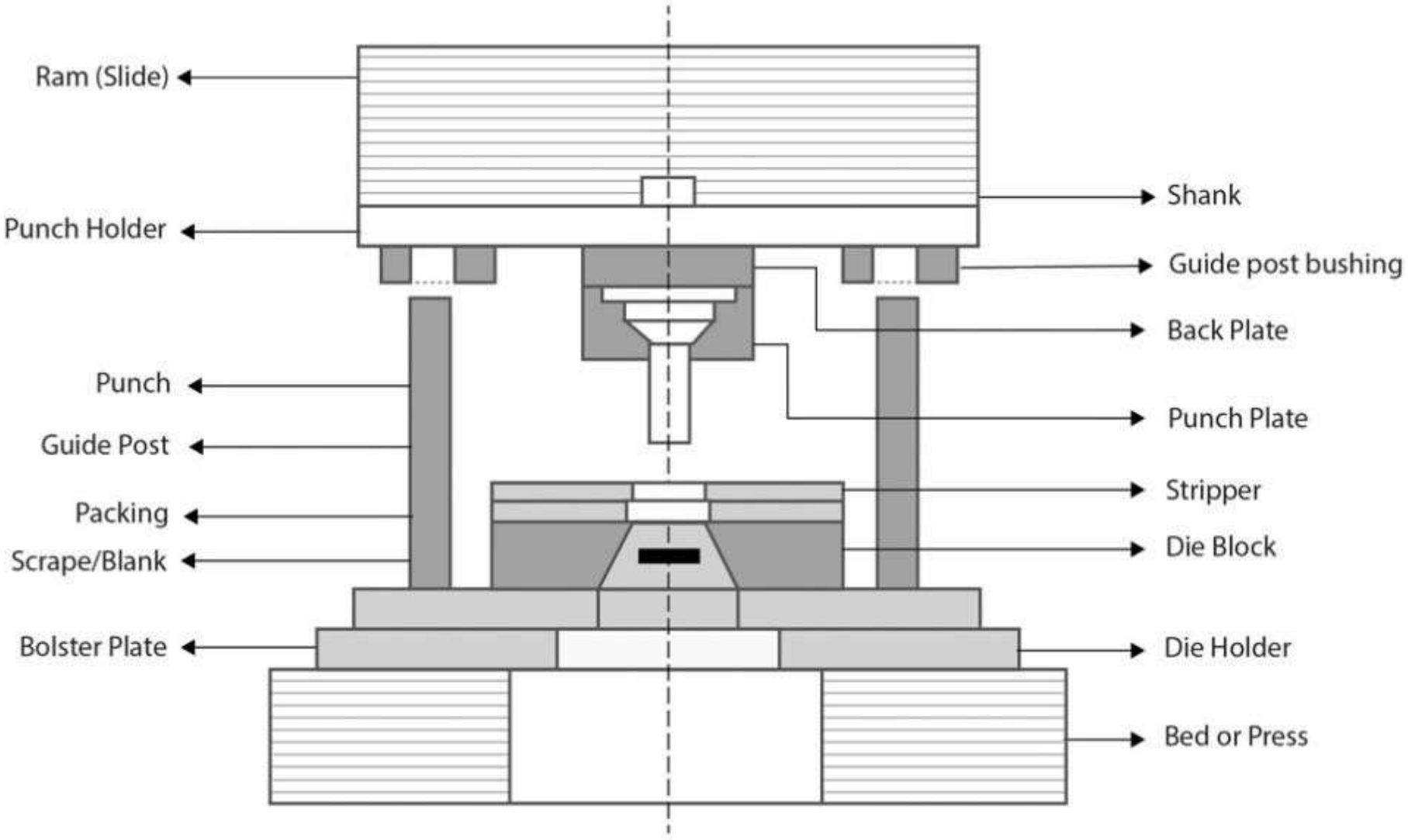
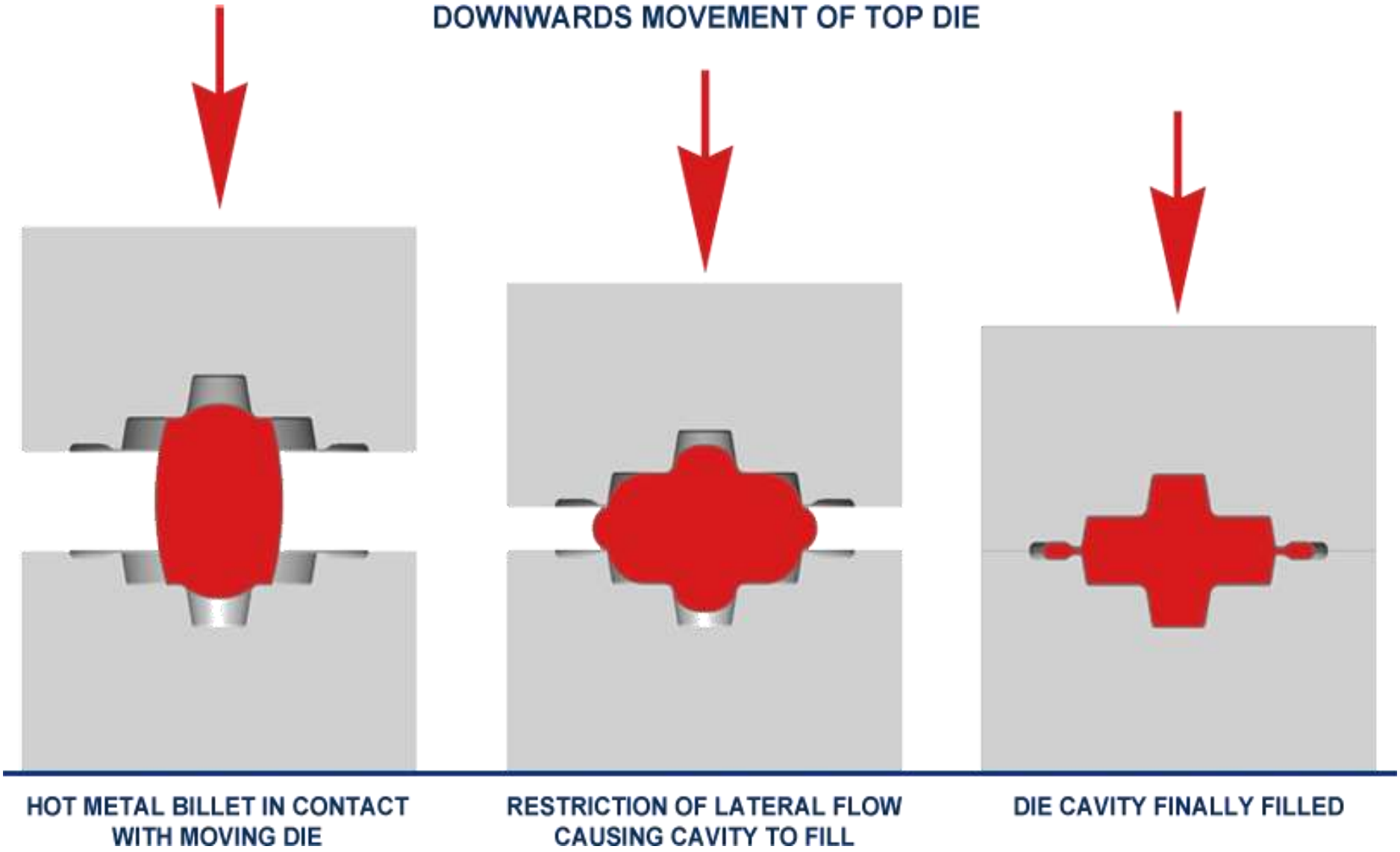
UNIT-V PRESS TOOS

Generally press tools are categorized by the types of operation performed using the tool, such as blanking, piercing, bending, forming, forging, trimming etc.


Ram (Slide)
Punch Holder
Punch
Guide Post
Packing
Scrape/Blank
Bolster Plate
Shank
Guide post bushing
Back Plate
Punch Plate
Stripper
Die Block
Die Holder
Bed or Press

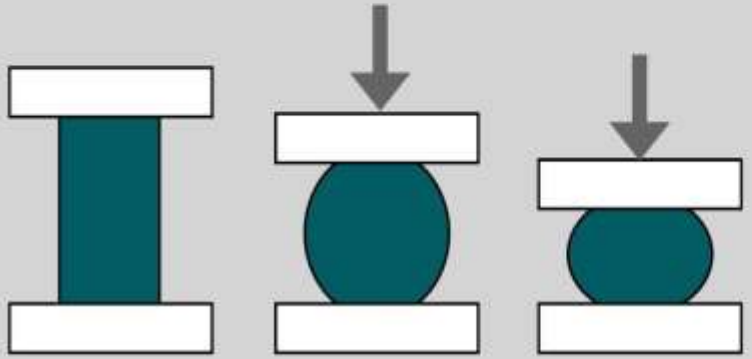
- **Metal forging is the process in which metals are formed and shaped using compressive forces.**
- **The forces are delivered using hammering, pressing, or rolling.**
- **There are a number of forging processes – cold forging, warm forging, and hot forging**
- **There are four types of forging manufacturing processes that are commonly used to shape metal parts.**
- **These processes include impression die forging (closed die), cold forging, open die forging, and seamless rolled ring forging.**


DOWNWARDS MOVEMENT OF TOP DIE
HOT METAL BILLET IN CONTACT WITH MOVING DIE
RESTRICTION OF LATERAL FLOW CAUSING CAVITY TO FILL
DIE CAVITY FINALLY FILLED

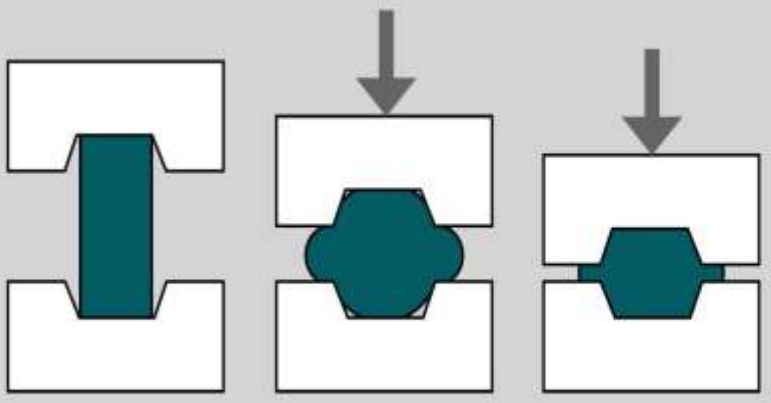
Open-die forging is also known as smith forging. A hammer strikes and deforms a metal on a stationary anvil.

Open and Closed Die Forging Processes

(1) OPEN-DIE FORGING



(2) CLOSED-DIE FORGING

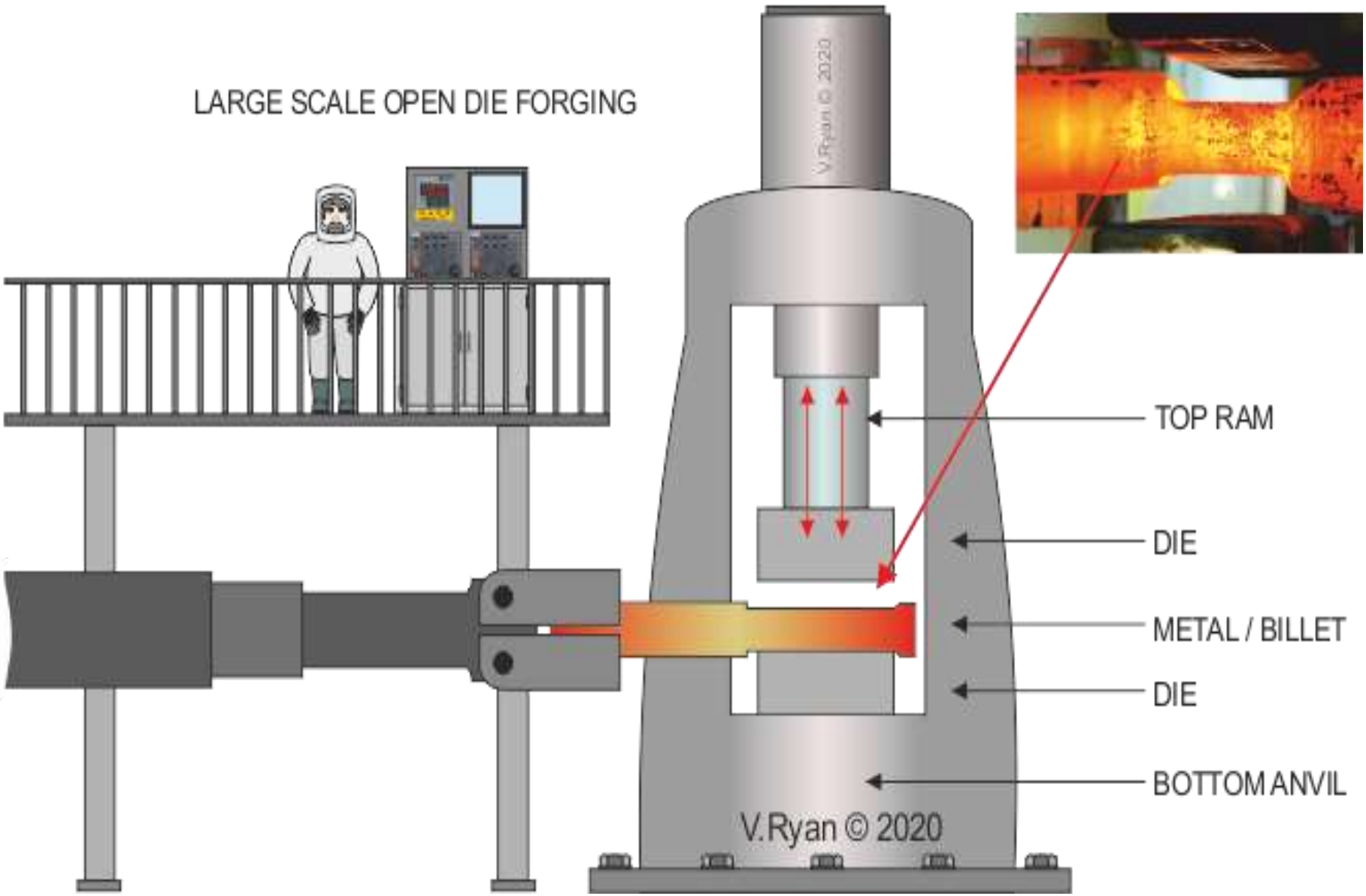


- **Drop forging is a metal forming process. A workpiece is inserted into a die and then hammered until it has assumed the shape of the die.**

- **The lower die is a stationary part, while the upper part is a moving hammer dropped onto the workpiece in order to deform it.**

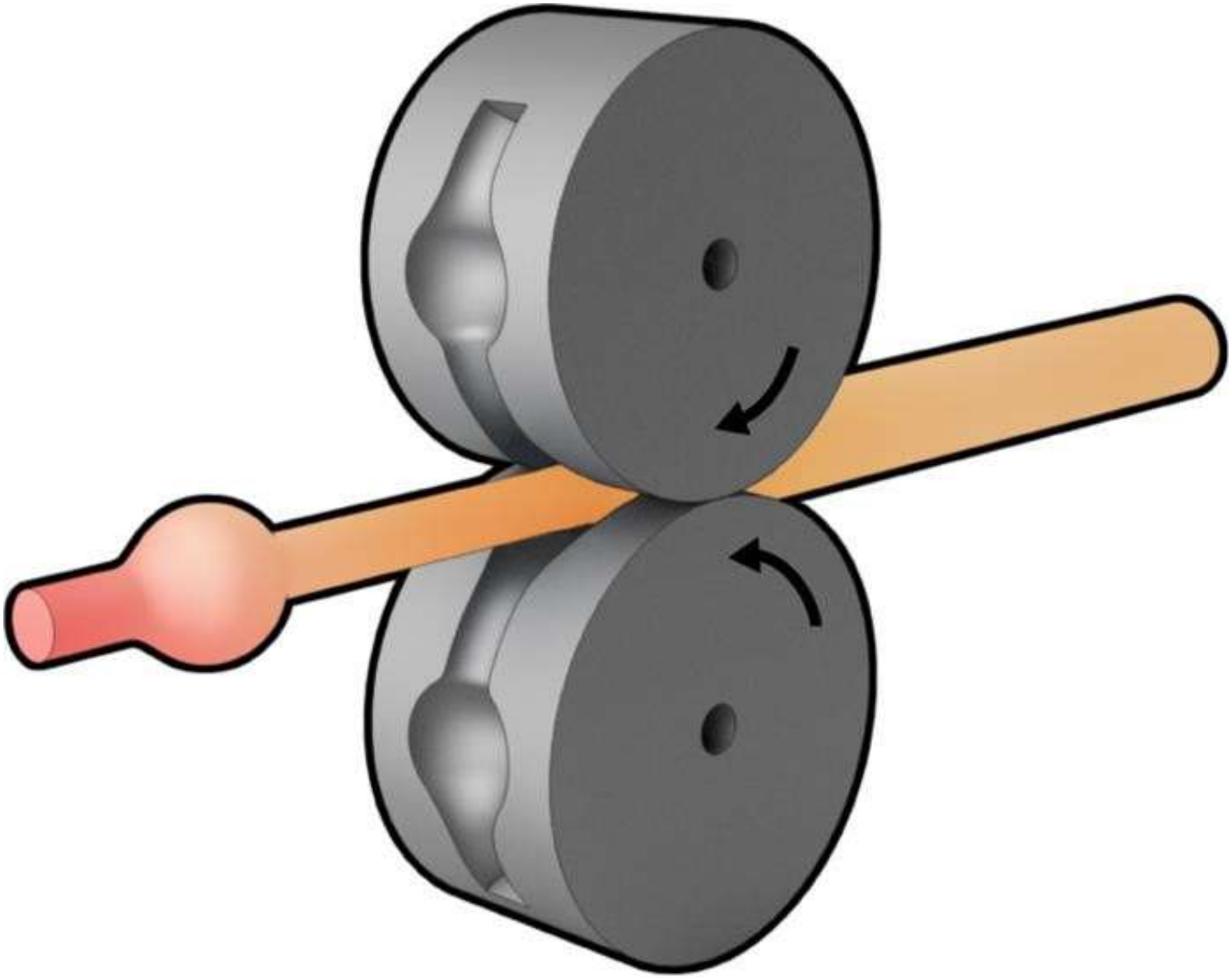
- **The drop forging process improves the strength of the metal by aligning the grain along the lines of potential stress, which cannot be achieved through casting, machining, or fabrication.**

LARGE SCALE OPEN DIE FORGING



- **Roll forging, also known as roll forming, is a forging method that uses opposing rolls to form a metal part.**

- **Even though roll forging uses rolls to produce parts and components, it is still considered a metal forging process and not a rolling process.**



FORGING HAMMER

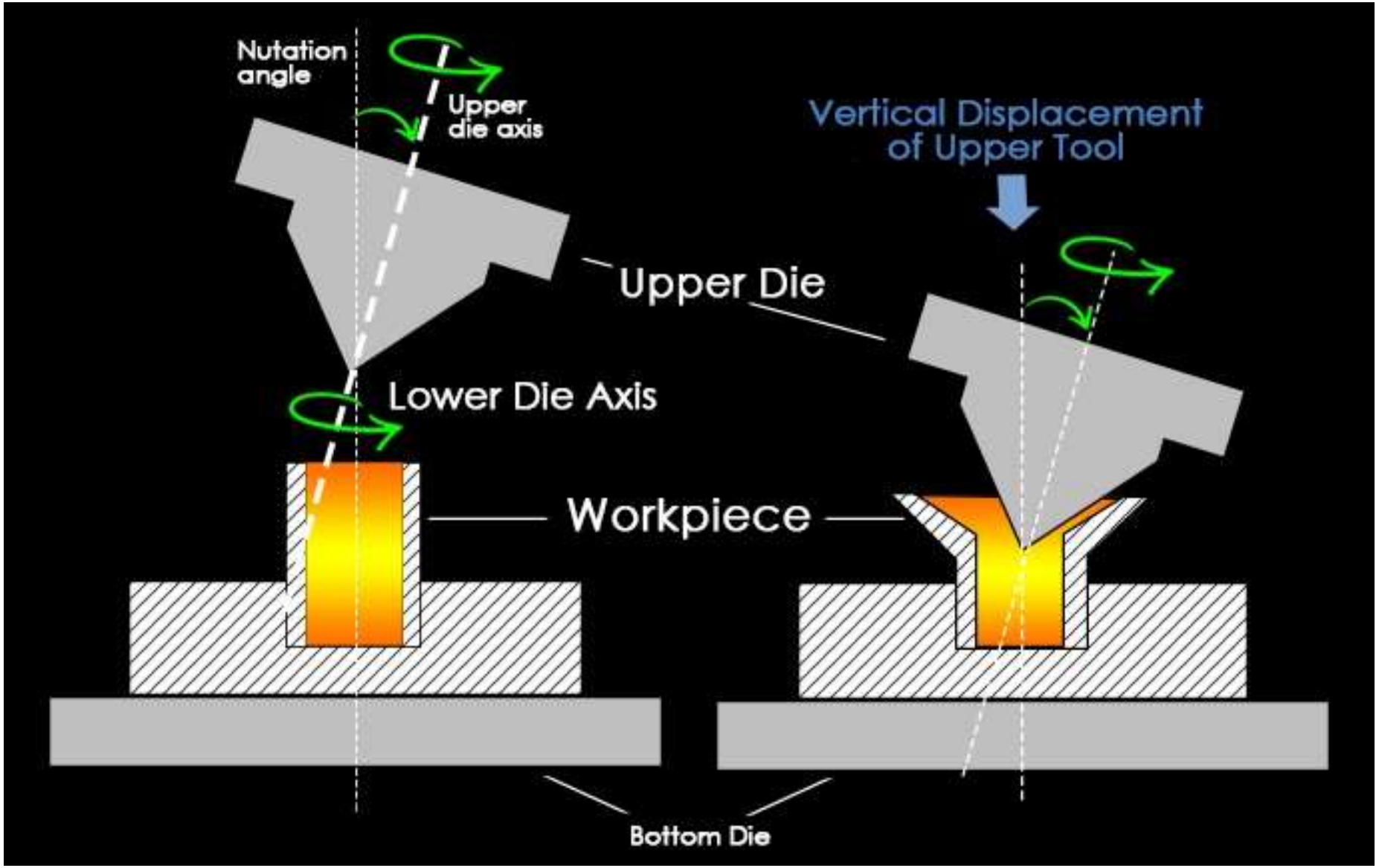
The handle of the forging hammer is typically made of a wooden material and the head is sometimes made of high-carbon steel or alloy steel

BAILEY
BAILEY

ROTARY FORGING

- **Rotary forging is a cold-forming process used to forge round shapes.**

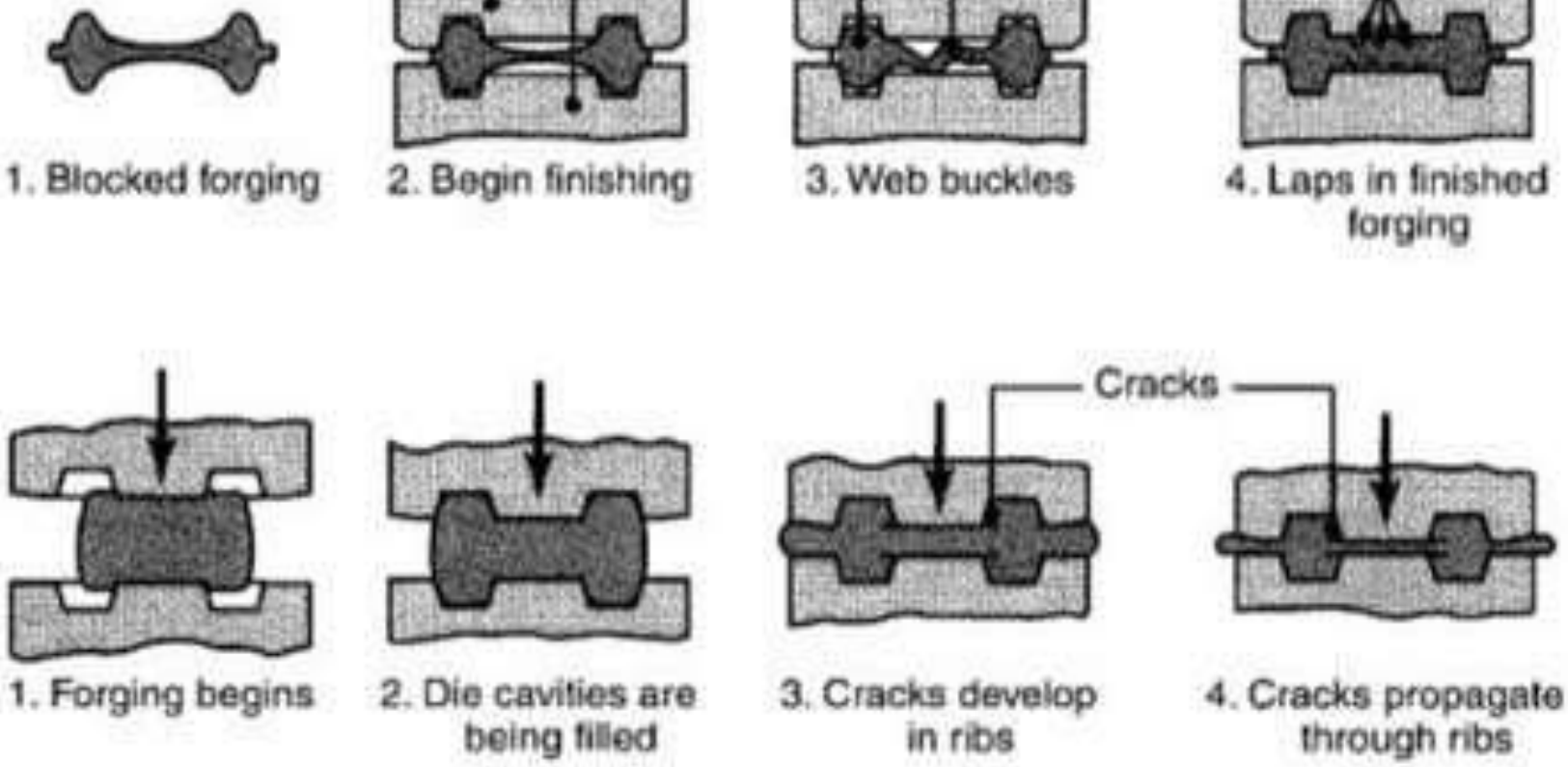
- **The process deforms a metal blank using a combination of rotation, rolling and axial compression.**


Nutation angle
Upper die axis
Vertical Displacement of Upper Tool
Upper Die
Lower Die Axis
Workpiece
Bottom Die

FORGING DEFECTS

- **Defects occur due to improper design of forging die.**
- **It is also due to sharp corner, and excessive chilling in forging product.**
- **The fillet radius of the die should be increase to remove these defects**

Forging Defects



COLD FORGING

- Cold forging uses a displacement process to shape the material into the desired shape.
- Compressive force squeezes the metal between a punch and die at room temperature until the material conforms to the die's contours.
- Cold forging techniques include rolling, drawing, spinning, heading, and extruding.

SWAGING

Swaging, is a metal-forming technique in which the metal of one part is deformed to fit around another part by hammering, or by forcing the material through a die.