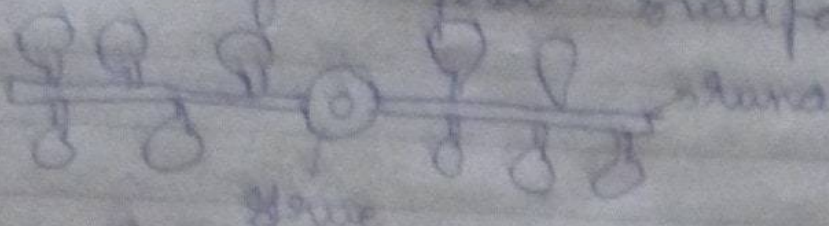
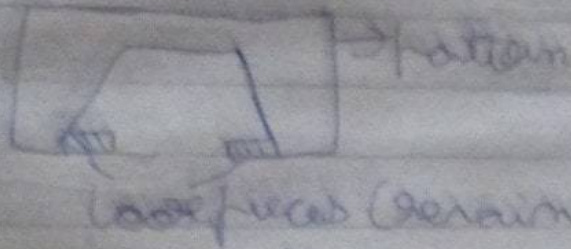


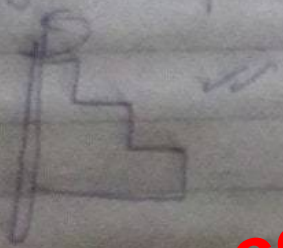
• **Gated Pattern** - ~~partial prod~~ ^{partial prod} - small part



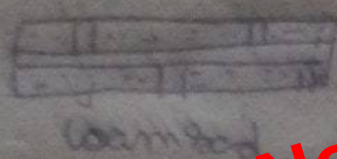
• **Loose Piece Pattern** - loose pieces in it, can be ^{you use} ~~2 or 3~~ ^{2 or 3} ~~edges~~ ^{edges}



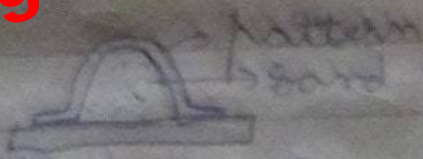
• **Sweep Pattern** - to make symm. ~~pattern~~ ^{parts} ~~make~~ ^{make} - save time & material



• **Skeleton** -



• **Follow Board** - ~~pattern~~ ^{follow board} ~~support~~ ^{support}



• **Shell pattern** - hollow pattern

→ **Pattern Allowances**

• **Shrinkage Allowances** - controlⁿ of casting
- liq. → solid (shrink) (change of phase)
Remedy - dimensions of mould

• **Distortion Allowances** - shape distort on cooling
- due to diff. in metal shrinkage at diff. pts.

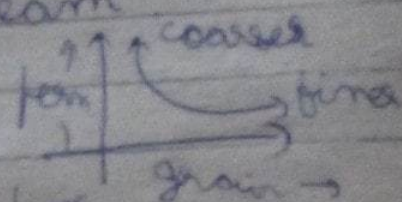


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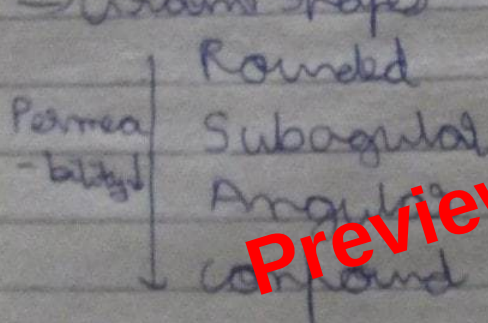
- Additives - Wood Flour - Iron Powder
- Backing Sand - Particled
 - (moulding sand + sand)

→ Moulding Sand Properties -

- Permeability - escape gases/steam
Controlled by shape & size of bed
- Flowability - able to flow inside box
- Cohesiveness/strength - Adhesiveness - wall & bed
- Refractiveness - withstand high temp
- Collapse - ^{during} after solid, collapse itself, allow free contract



→ Grain Shapes -



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→ Moulding Tools & Equip. -

- Shovel
- Trowel
- Riddle
- Moulding Box
- Rammer
- Sprue Pin
- Strike off Bar
- Draw spikes
- Vent Rod
- Swab

Layers of charge - Metal
Coke
 CaCO_3 (flux)

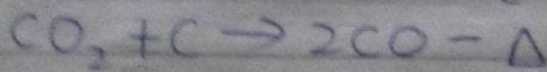
• Zones - (Down to Up)

- Well - Molten metal collected

- Combustion zone - $(1500 - 1800^\circ\text{C})$

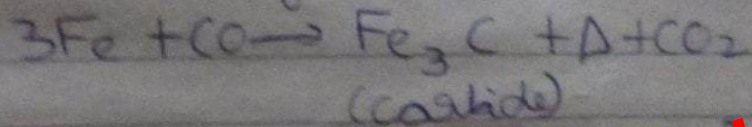


- Redⁿ Zone - (1200°C) ~~1600°C~~



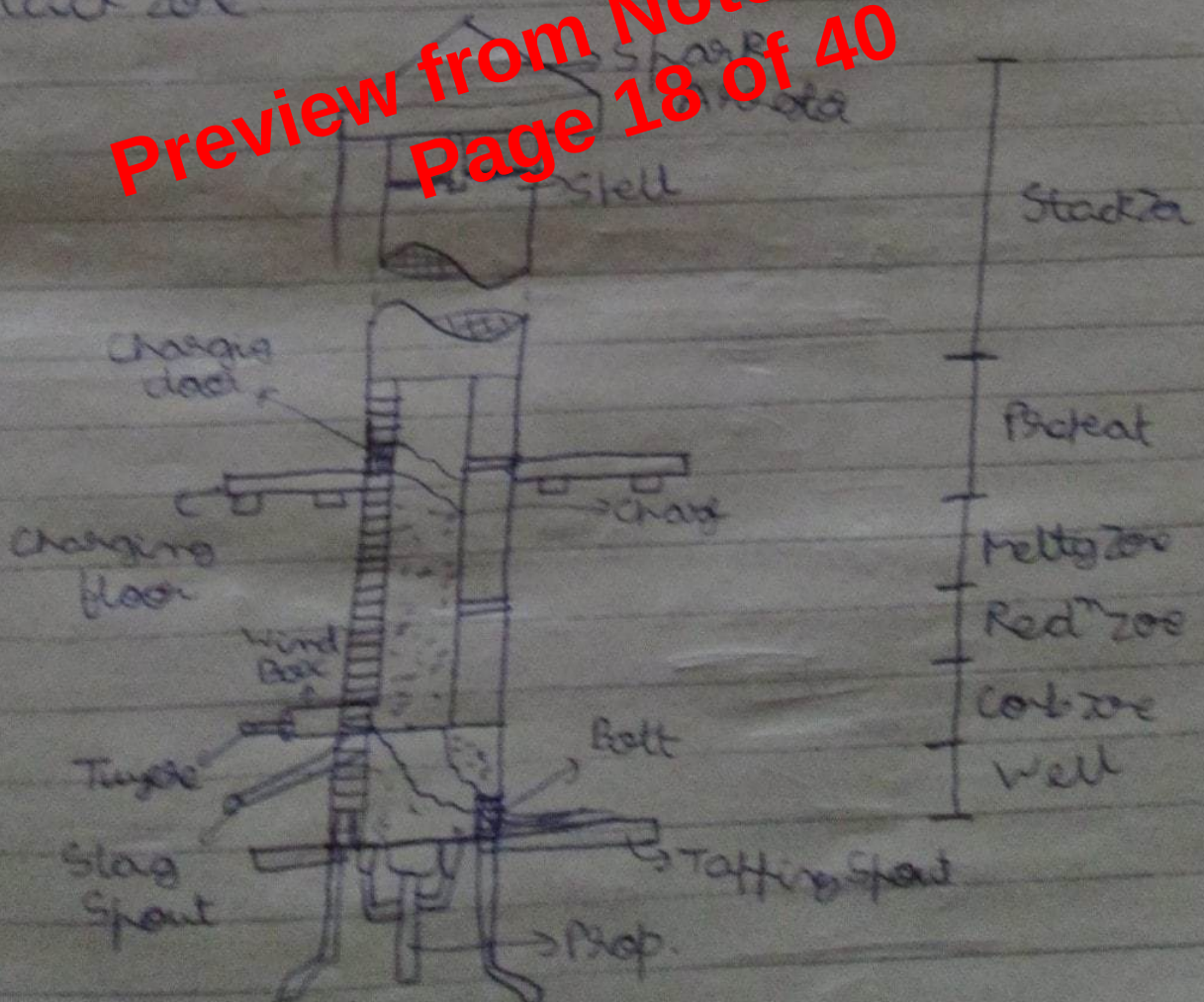
↳ protects metal from oxidising. (temp. + as heat absorbed)

- Melting Zone -



- Preheat Zone - Contains charge

- Stack Zone



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- Other ops -
- Cutting - metal is removed with chisel
- Bending - striking with hammer (after)

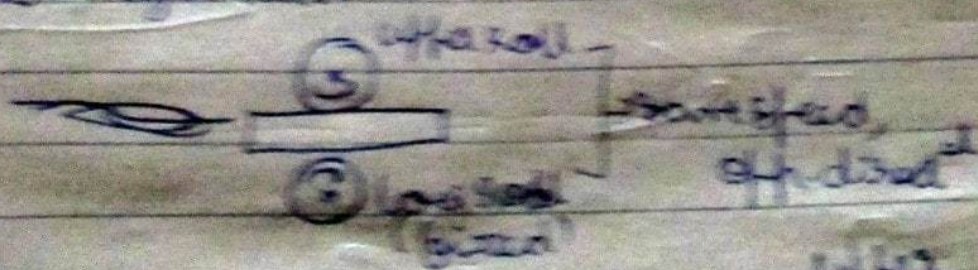
→ Extrusion process -



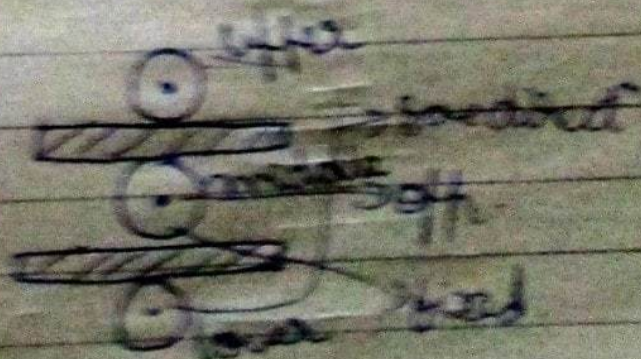
- Can be in hot or cold work, acc. to ductility
- forcing of metal through shaped dies

→ Rolling - forcing metal into desired shape by passing through rollers

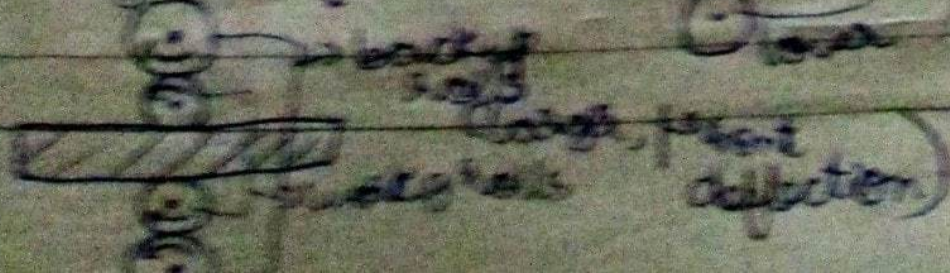
- Also known as
- Hot & cold rolling
- Two high mill



• Three high mill -



• Four High mill



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- Adv. - smooth & sound welds • no flux req.
- Disadv. - separate filler rod • Tugston
Can Coland

not faster as MIG
- costly

- App. - non ferrous metals, thick sect³

→ Resistance Welding -

- by applying pressure. - resist. is offered to the current, this raises temp. ($H = I^2 RT$)
- pressure app. to complete process

- Types -

- Butt welding -

a) Upset

- clamped edge to edge

solid contact

- as P applied, joint

- non-ferrous material.

b) Flash

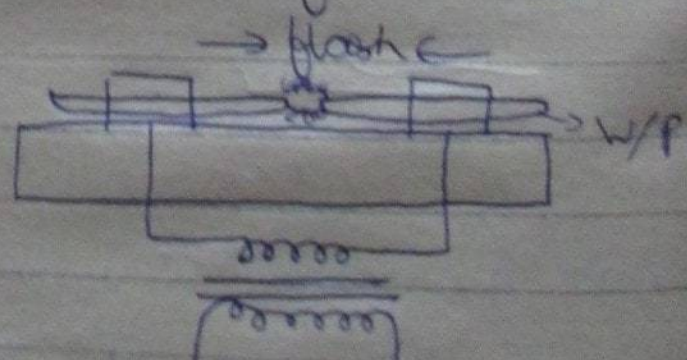
- in light contact

high V switched on,

approach each other

- +12 joint

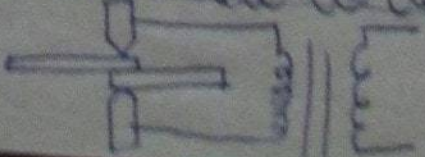
- ferrous material.



- Spot welding - for overlapping sheets, strips

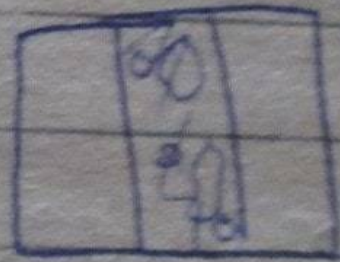
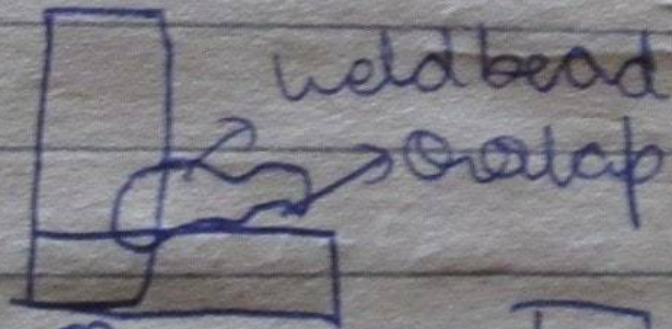
- high current - W/P A deto resist.

- pressure forces metal to weld.



→ Welding defects -

- Cracks
- Porosity
- Overlapping



- Poor Penetration

