Section-3 Q1. Ans:→

⇒ Common Casting Defects :-

① Mould Shift :- It results in a mismatching of the top & bottom parts of a casting, usually at the parting line.

⇒ Causes :- It occurs due to :-
- Misalignment of pattern parts, due to worn or damaged patterns.
- Misalignment of moulding box or flask equipment.

⇒ Remedies :- This defect can be prevented by ensuring proper alignment of the patten, moulding boxes, correct mounting of pattern on pattern plates etc.

② Core Shift :- It is an abnormal variation of the dimensions which are dependent on core position.

⇒ Causes :- Misalignment of cores in assembling cored moulds.
- Undersized or oversized core prints.
- By using incorrect size of chaplet.

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⇒ Remedies:- This defect can be eliminated by providing the core at the proper place and must be gripped properly in the sand.

(3) Swell:- It is an enlargement of the mould cavity by molten metal press. resulting in localised or general enlargement of the casting.

⇒ Causes:- Due to insufficient ramming of sand.
- Due to insufficient weighting of the drag during casting.
- Due to pouring of molten metal too rapidly.

⇒ Remedies:- The swells are avoided by the proper ramming of sand & uniform of molten metal into the mould.

(4) Sand Wash:- It usually occurs near the in-gates as rough lumps on the surface of a castings. The sand that has been washed away appears on the upper surfaces of the castings as rough holes or depressions.

⇒ Causes:- Soft ramming of sand
- Weak Sand
- Poor pattern
- Insufficient draft.

⇒ Remedies:- This defect is avoided by the proper ramming of sand.

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(5) Hot Tear :- It is an internal or external ragged discontinuity in the metal casting resulting from hindered contraction occuring just after the metal has solidified.

⇒ Causes :- Abrupt changes in section, inadequate filleting of inside corners, & improper placement of chills.

- Poor collapsibility of mould & core materials which will place extra stress on certain details.
- Improper pouring temperature.

⇒ Remedies :- In order to eliminate this defects, abrupt changes in section should be avoided. The pouring temp. should be correct & there should be even rate of cooling.

(6) Sand Blow or Blow Hole :- It is excessively smooth depression on the outer surface of a casting. This defect is also called blow hole.

⇒ Causes :- This defect occurs due to high moisture content in moulding sand.

- Low permeability of sand.
- Hard ramming of sand
- Defective gating system.

⇒ Remedies :- This defect can be removed by proper venting, completely drying up the mould, selecting proper sand with required permeability & proper Pingate system for the flow of molten metal.

(f) Cold Shuts and Misruns :- These occurs when the mould cavity is not completely filled and an incomplete casting results.

⇒ Causes :- Too small gates.
- Too many restrictions in the gating system.
- Pouring head is too low,
- Faulty venting of the moulds.

⇒ Remedies :- In order to eliminate these defects, the casting should be designed keeping in mind the fundamental principles of gating and risers.
- Thin sections should be preheated & the molten metal should be poured at the correct temp.

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#⇒ The following Residual stresses in Casting Process:-

- Different section of a non-uniform cross-section casting solidify at different rates depending on their cross-section areas.

- This results in varying amount of contraction in different parts, products high internal stresses, which may cause tearing or cracking of casting.

- High residual internal area stresses can be avoided by placing chills over large cross-sectional areas so that whole of casting cools at uniform rate.

- Another method of controlling such stresses is take out casting at an average temperature of around 750°C and putting it in an insulated pit and allowed to cool at 5.5°C/hour.

- It may be mentioned that any temp. gradient above 540°C does not gives to elastic strain because same is relaxed to plastic strain due to high rate of creep.

(2) *

Hot Working	Cold Working
• Working temp. is above the recrystallization temp.	• Working temp. is below the recrystallization temp.
• Hardening due to plastic deformation is completely eliminated by recovery & new grain formation.	• No hardening due to low temp.
• Poor surface finish due to oxidation.	• Better surface finish.
• Density of metal is increased due to new grain formation.	• No such effect in the density of metal.
• Lighter equipment is used.	• Heavier equipment is used.
• less loading is required.	• large application is required (used)
• Eg. → Hot forging, hot rolling, hot spinning, hot extrusion, hot drawing etc.	• Eg. → Cold rolling, cold Extrusion, press work like bending, shearing, drawing etc.