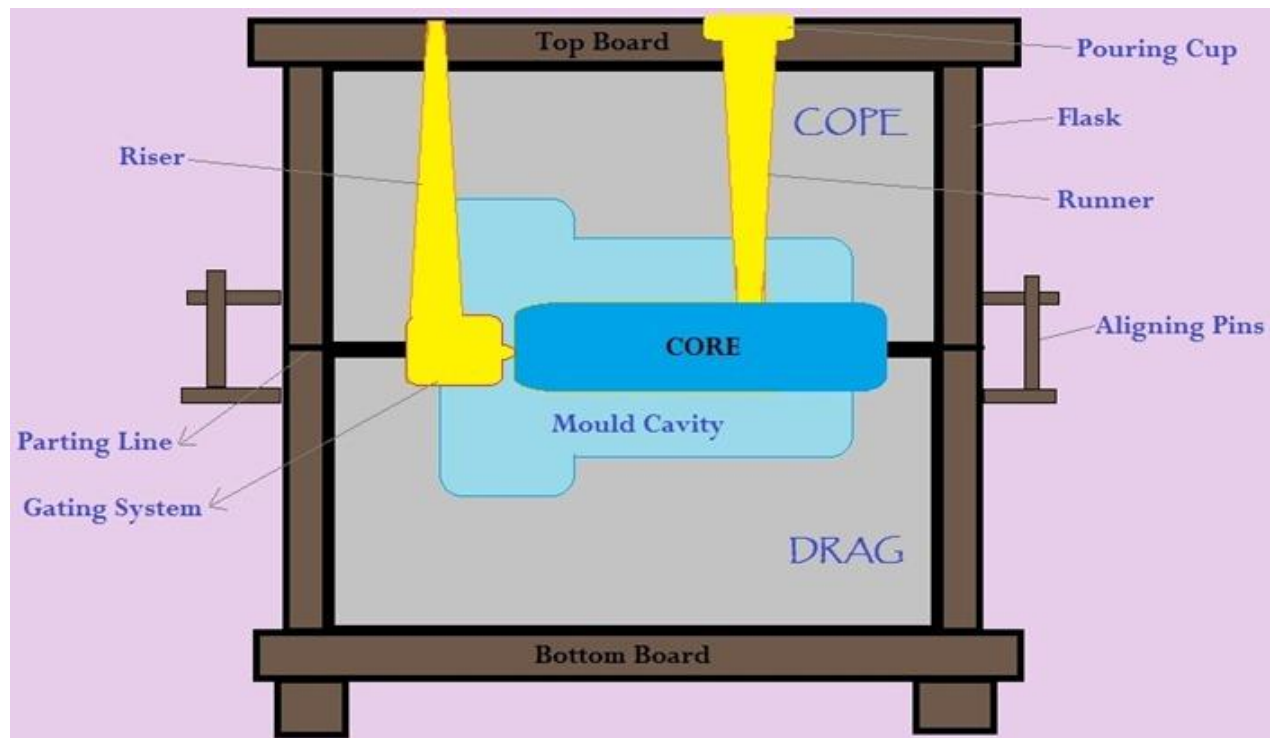


FOUNDRY SHOP



SAFETY PRECAUTION

1. Leather gloves, shoes, & apron should be wearing during the working period at foundry shop.
2. Vent hole for passing air & gas should be made proper in mould by vent wire.
3. Moisture content should be check before moulding.
4. Moulding box cope & drag should keep in proper alignment on the moulding bench.
5. Ramming of sand should be done properly during moulding.
6. Runner, Riser & gate should be set in proper alignment.
7. Remove carefully all the extra item like runner, riser, gate, and pattern etc. after complete desire mould.

LIST OF EXPERIMENT

1. To study the different type of hand tools, materials and moulding processes used in foundry shop.
2. To prepare a Sand mould for solid casting with the help of given Step Pulley Pattern.
3. To prepared the mould for hollow casting with the help of Step Pulley Pattern and core.

EXPERIMENT NO. 1

OBJECTIVE:- To study the different type of hand tools and materials used in foundry shop.

FOUNDRY HAND TOOLS

SHOWEL: It consists of an iron pan with a wooden handle it can be used for mixing and conditioning the sand and then transferring the mixture in some container (See fig.1)

TROWEL: These are used for finishing flat surface and corner inside a mould (See fig.2).



Fig.1



Fig.2

LIFTER: A lifter is a finishing tool used for repairing the mould and finishing the mould sand. Lifter is also used for removing loose sand from mould. (See fig. 3)

HAND RIDDEL: It is used for ridding of sand to remove foreign material from it. It consists of a wooden frame fitted with a screen of standard wire mesh at the bottom. (See fig. 4)



Fig. 3



Fig. 4

STRIKE OFF BAR: It is a flat bar made of wood or iron to strike off the excess sand from the top of a box after riming. (See fig.5)

VENT WIRE: It is a thin steel rod or wire carrying a pointed edge at one and a wooden handle or a bent loop at the other. After ramming and striking of the excess sand it is used to make small holes called vents in the sand mold to allow the exit of gasses and steam during casting. (See fig. 6)

DRAW SPIKE: It is a tapered steel rod having a loop or ring at it is one end and a sharp point at the other it is used to tap and draw patterns from the mould.



Fig. 5



Fig. 6

RAMMER: Rammer are used for striking the sand mass in the molding box to pack it closely around one pattern. (See fig. 7)

- a) Peen rammer
- b) Floor rammer
- c) Hand rammer

SLICKS: This is used for repairing and finishing the mould surfaces and edges after the pattern has been withdrawn the commonly used slices are heart and leaf square and heart spoon and bead and heart and spoon. (See fig. 8)



Fig. 7



Fig. 8



SMOOTHER AND CORNER SLICKS: They are also finishing flat and round surfaces round or square corners and edges.

SWAB: It is a hemp fiber brush used for moistening the edges of sand mould which are in contact with the pattern surfaces before withdrawing the pattern it is also used for coating the liquid blocking on the mould faces in dry sand moulds. (See fig. 9)



Fig. 9



Fig. 10

Runner: The channel through which the molten metal is carried from the sprue to the gate. (See fig. 10)

Riser: A column of molten metal placed in the mould to feed the castings as it shrinks and solidifies. Also known as “feed head”. (See fig. 10)

DRAW SCREWS AND RAPPING PLATE: It is a long mild steel rod with a ring in one end and threaded at the other, there is a plate known as rapping plate consisting of several tapped holes. (See fig. 11).

MOULDING BOXES: The moulding boxes or flasks used in sand moulding are of two types (See fig. 12).

(a) Closed moulding boxes.

(b) Open type of snap flasks.

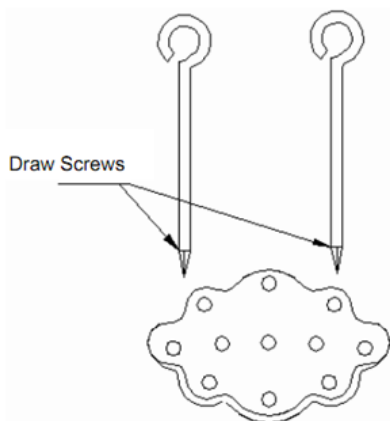


Fig. 11



Fig. 12

MOULDING SAND

Moulding sand is one of the most important materials in production of sand casting. Sand is formed by breaking up of rocks due to natural forces such as frost wind, rain and action of water.

- a. Natural sand
- b. Synthetic sand

TYPES OF SAND USED IN MOULDES

- | | |
|------------------|-----------------|
| 1. Dry sand | 2. Green sand |
| 3. Loam sand | 4. Facing sand |
| 5. Parting sand | 6. Backing sand |
| 7. Core sand | 8. Oil sand |
| 9. Molasses sand | |

COMPOSITION OF GREEN SAND

- | | |
|-----------------------|------------------|
| 1. Silica sand 75% | 2. Coal dust 8% |
| 3. Bentonite sand 12% | 4. Water 5 to 6% |

PROPERTIES OF MOULDING SAND

- | | |
|------------------------------|-------------------|
| 1. Porosity and permeability | 2. Refractoriness |
| 3. Adhesiveness | 4. Cohesiveness |
| 5. Chemical resistance | 6. Plasticity |
| 7. Moisture | |

MAIN CONSTITUENT OF MOULDING SAND

The principal constituents of moulding sand are

- | | |
|----------------|-----------|
| 1. Silica sand | 2. Binder |
| 3. Additives | 4. Water |

BINDERS

The purpose of adding to the binder to the moulding sand is to impart it sufficient strength & cohesiveness so to enable it to retain its shape after the mould has been rammed & the pattern withdrawn. However it produces an obverse effect on the permeability of the sand mould.

OUTCOMES: - On successful completion of this experiment, the students will be able to understanding the proper name and working of moulding hand tools and material process and moulding sand and their properties.

EXPERIMENT NO. 2

OBJECTIVE:- To prepare a Sand mould for solid casting with the help of Step Pulley Pattern.

Material Required: Green sand

Tools to be used: Step Pulley Pattern, Moulding boxes or flasks, Trovels, Plane smoother Lifter Vent wire, Swab, Gate Cutter Spru pin, Spru cutter, Slicks, Draw spike.

Drawing:- See fig. 13

Procedure:- Take the moulding box and properly placed it on the table. With the help of trovel filled the green sand inside the drag of the moulding box. Now ram the sand using the rammer leaving a very little space over drag in order to place the pattern. After placing the pattern match the centre point of the pattern with that of the above part of drag. Hold the pattern over there for a while and fill the sand around the pattern properly. Remove the extra sand with the help of leveling scale or plane smoother. Adjust the gate cutter on either side of the pattern and place two sprue pins on the respective gate cutter. One of the pin will act as a runner and other will be as riser. Now place the cope of moulding box over drag and fill it properly with the sand with the help of rammer. Remove the extra sand with plane smoother. After leveling, using vent wire make small holes over the mould cavity in order to provide proper ventilation of gases. Slightly pick up the cope . remove the pattern slowly and replace it on the drage. Also, remove gate cutters from drag as well as sprue pins from cope. Now, make core using core box and core sand of desired size. Place this core on core prints inside the mould cavity in order to get the desired cavity of hollow cylinder.

Precautions:

1. Cope & Drag part of moulding box should be kept in proper alignment.
2. Runner and Riser should be placed in proper alignment.
3. Parting sand should be provided in between cope and drag.
4. Remove the extra item like runner, riser and pattern very carefully after completing the desired mould.
5. Holes using vent wire should be made before removing the pattern from the moulding box.

Outcomes: - On successful completion of this experiment, the students will be able for prepare a sand mould for solid casting at proper way.

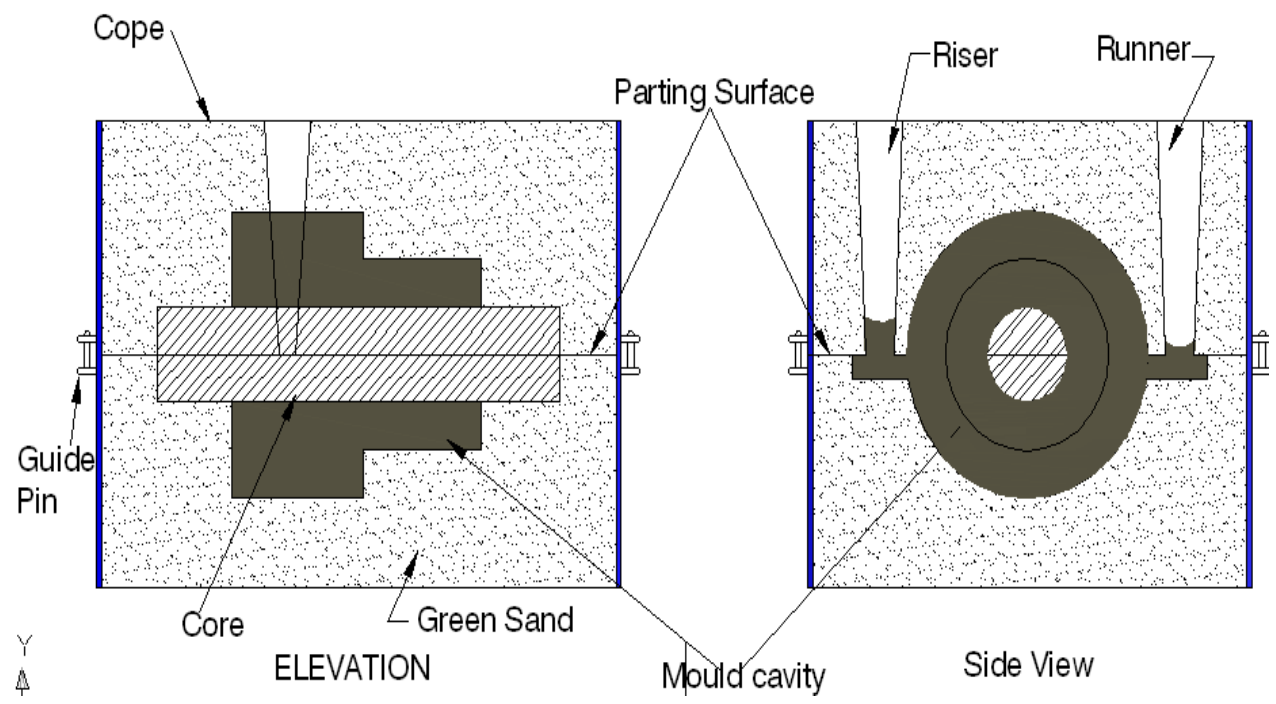


Fig. 13

EXPERIMENT NO. 3

OBJECTIVE:- To prepared the mould for hollow casting with the help of pattern and core.

Material Required: Green sand.

Tools to be used: Pattern, Moulding boxes or flasks, Trovels, Plane smoother Lifter Vent wire, Swab, Gate Cutter Spru pin, Spru cutter, Slicks, Draw spike

Drawing:- see fig. 14

Procedure:- Take the moulding box and properly placed it on the table. With the help of trovel filled the green sand inside the drag of the moulding box. Now ram the sand using the rammer leaving a very little space over drag in order to place the pattern. After placing the pattern match the centre point of the pattern with that of the above part of drag. Hold the pattern over there for a while and fill the sand around the pattern properly. Remove the extra sand with the help of leveling scale or plane smoother. Adjust the gate cutter on either side of the pattern and place two sprue pins on the respective gate cutter. One of the pin will act as a runner and other will be as riser. Now place the cope of moulding box over drag and fill it properly with the sand with the help of rammer. Remove the extra sand with plane smoother. After leveling, using vent wire make small holes over the mould cavity in order to provide proper ventilation of gases. Slightly pick up the cope . remove the pattern slowly and replace it on the drage. Also, remove gate cutters from drag as well as sprue pins from cope. Now, make core using core box and core sand of desired size. Place this core on core prints inside the mould cavity in order to get the desired cavity of hollow cylinder.

Precautions:

1. Cope & Drag part of moulding box should be kept in proper alignment.
2. Runner and Riser should be placed in proper alignment.
3. Parting sand should be provided in between cope and drag.
4. Remove the extra item like runner, riser and pattern very carefully after completing the desired mould.
5. Holes using vent wire should be made before removing the pattern from the moulding box.

Outcomes: - On successful completion of this experiment, the students will be able for preparing a sand mould for hollow casting (pipe, hollow cylinder etc) at proper way.

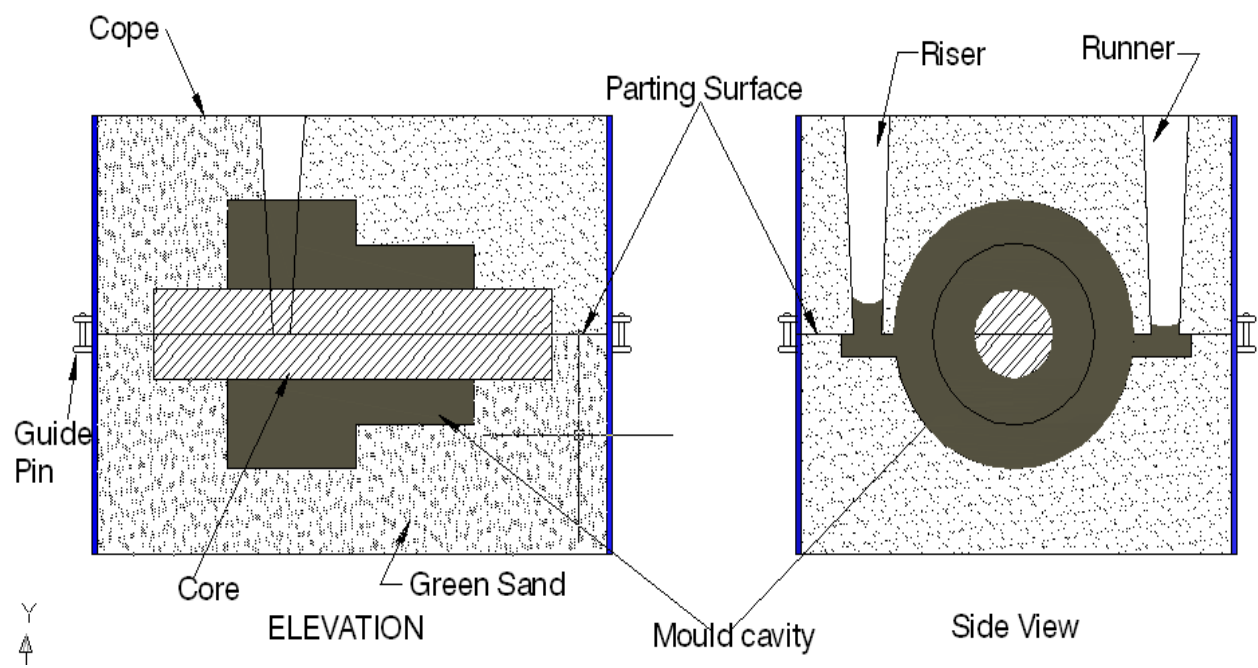


Fig. 14