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 carfully all the extra item like runner, riser, gate, and pattern, etc. after complete desire mould.

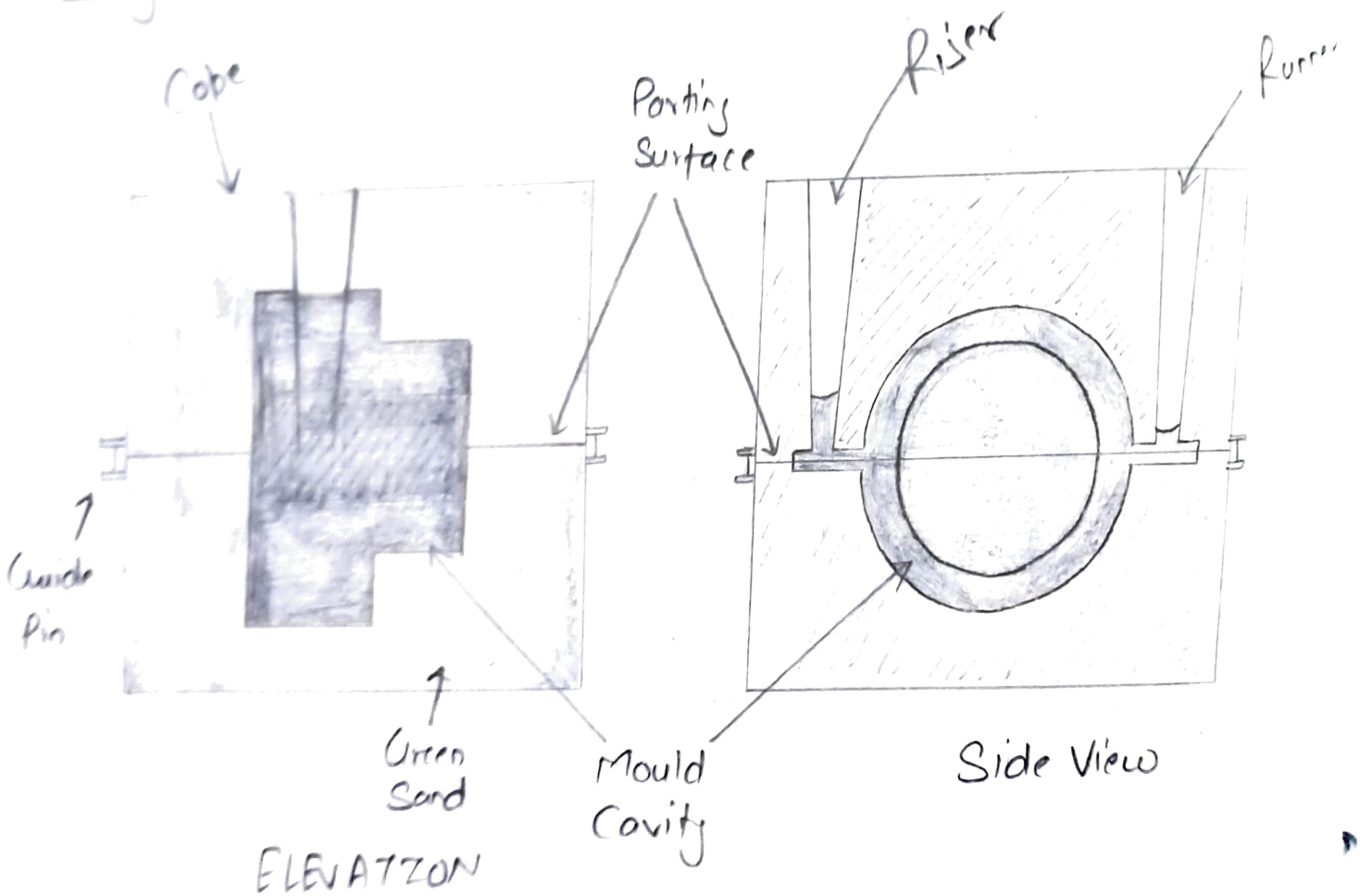
LIST OF EXPERIMENT

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.

Diagram:


Core
Parting Surface
Riser
Runner
Guide Pin
Green Sand
Mould Cavity
ELEVATION
Side View

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.

TROWEL → These are used for finishing flat surface and corner inside a mould.

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.

HAND RIDDEL → It is used for riddling 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.

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.

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 mould to allow the exit of gases and steam during casting.

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.

RAMMER → Rammer are used for striking the sand mass in the moulding box to pack it closely around one pattern:

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.

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 blacking on the mould faces in dry sand moulds.

RUNNER → The channel through which the molten metal is carried from the sprue to the gate.

RISER → A column of molten metal placed in the mould to feed the castings as it shrinks and solidifies. Also known as 'feed Head'.

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.

MOULDING BOXES → The moulding boxes or flasks used in sand moulding are of two types—

(a) Closed Moulding Boxes
(b) Open type of snap flasks

MOULDING SAND → Moulding sand is one of the most important and 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 MOULDS →

1- Dry Sand
2- Green Sand
3- Loom 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 → (5-6)%

PROPERTIES OF MOULDING SAND →

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

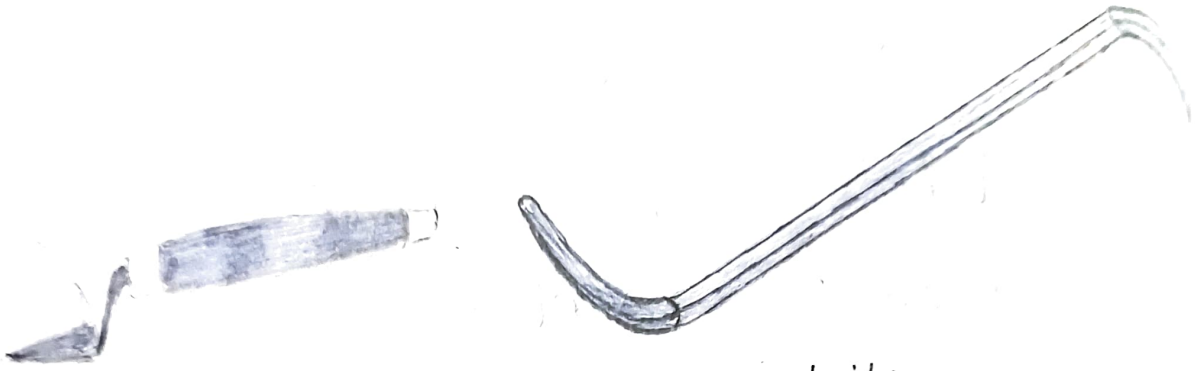
MAIN CONSTITUENT OF MOULDING SAND →

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 import 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.

RESULT: Experiment is successfully done. Mohd Zeeshan



Lifter

Trowel

Vent wire

Strike off bar

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, Trowels, Plane smoother lifter Vent wire, Swab, Gate Cutter Sprue Pin, Sprue cutter, Slicks, Draw Spike.

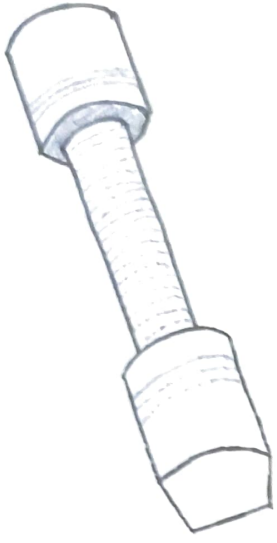
Procedure: Take the moulding box and properly placed it on the table. With the help of trowel filled the green sand inside the drag of the moulding box. Now ram the sand using the rammer leaving a very little space over drag in order to place the pattern. After placing the pattern match the centre point of the pattern with that of the above part of the 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 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 ventillations of gases. Slightly pick up to 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.

Precautions:

1- Cope & Drag part of moulding box should be kept in proper alignment.

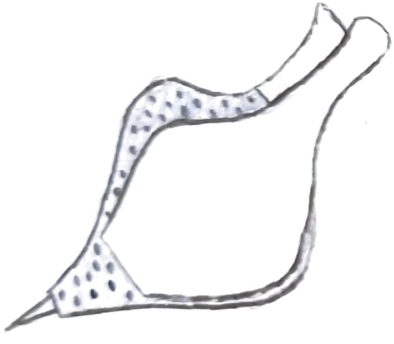
2- Runner & Riser should be placed in proper alignment.

3- Parting sand should be provided in blw cope & drag.

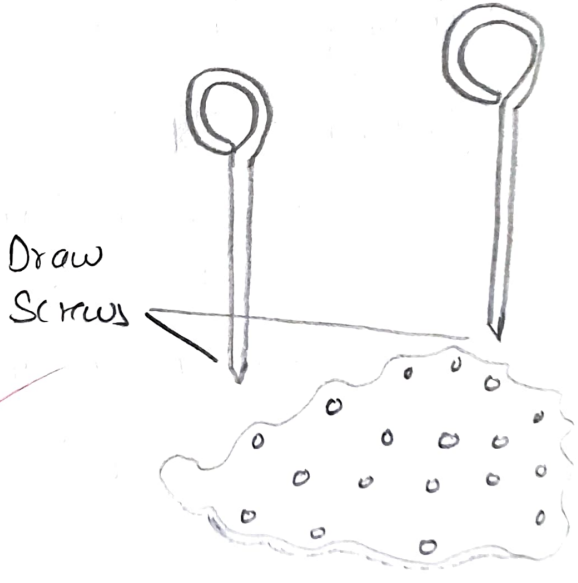


Rammer

Runner & Riser



Swab



Draw Screws and Rapping Plate

4- Remove the extra item like runner, riser and pattern very carefully after completing the desired mould.

5- Holes with vent wire should be made before removing the pattern from the moulding box.

Result: Sand mould of Step Pulley for solid casting is successfully prepared.

Mostafa

EXPERIMENT NO. 3

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

Materials Required: Green Sand

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

Procedure: Take the moulding box and properly placed it on the table. With the help of trovel fill 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 levelling, 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 droge. 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.

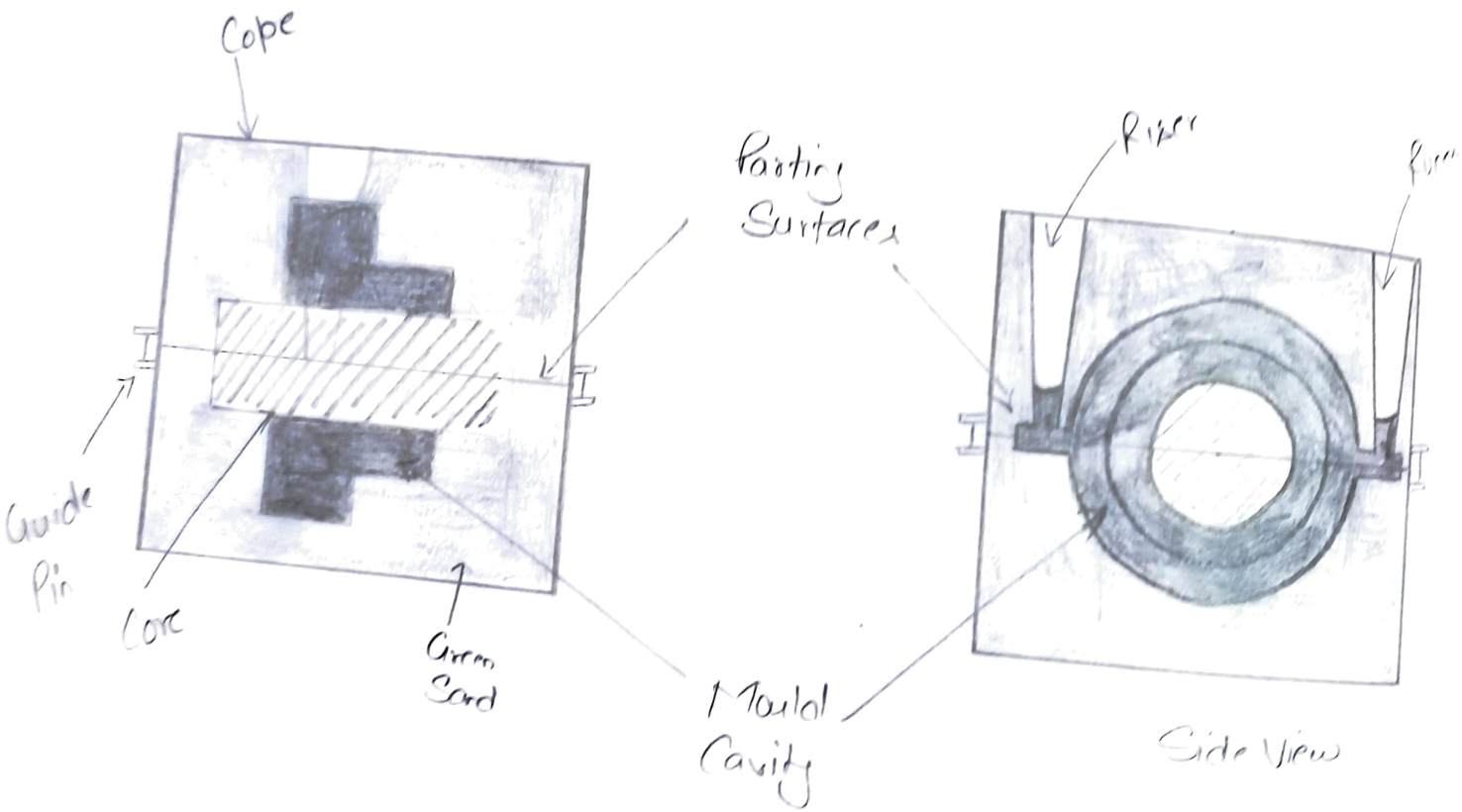
Precautions:

1- Cope & drag part of moulding box should be kept in proper alignment.
2- Runner & riser should be placed in proper alignment.
3- Parting sand should be provided in btw 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.

Result: Sand mould for hollow casting is successfully prepared.

Mogeel

Diagram:


Cope
Parting Surfaces
Riser
Guide Pin
Core
Green Sand
Mould Cavity
Side View