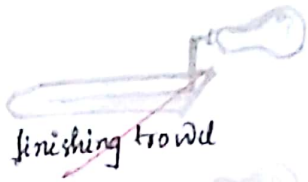
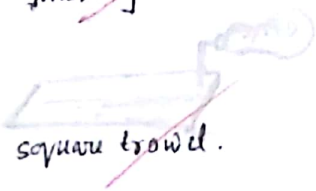
• Describe the following tools that are used in foundry shop. What purpose are they used for?

Trowel → A trowel consists of a metal blade fitted with a wooden handle. Trowels are employed in order to smooth or sleek over the surfaces of moulds. A moulder also uses them in repairing the damaged parts of a mould. The usual trowel is rectangular in shape and has either a round or square end.



finishing trowel



square trowel.

Lifter → Lifters are made of thin sections of steel of various widths and lengths. One end of them are a bit bend at right-angles. These bendings are for the sake of lifting. These are basically used for cleaning. Finishing the bottom and sides of the deep, narrow openings in the mould is done by a lifter.

lifter.

Rammer → A hand rammer is basically an wooden tool used for packing. The sand is rammed into the mould. One end of the rammer is called the peen. It is wedge shaped. The other end of it is called butt, and it has a flat-surface. Floor rammers are similar in construction but have long handles. Pneumatic rammers are used in large moulds saving considerable labour and time.

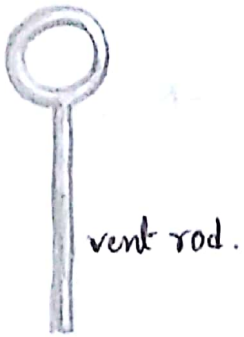
hand rammer.

Strike off bar → The strike off bar is mainly made of wood. Sometimes it is made of metals as well. It has a straight edge and a plane surface at the bottom. It is used to strickle or to strike off the excess sand. It makes the upper part of the sand plane after ramming. It basically works to give us a level surface.

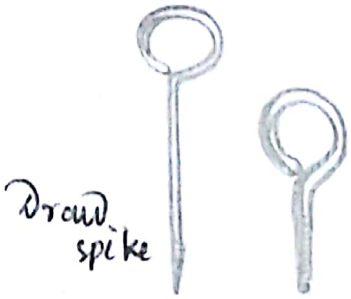
Strike off bar.

Roll - 1656005

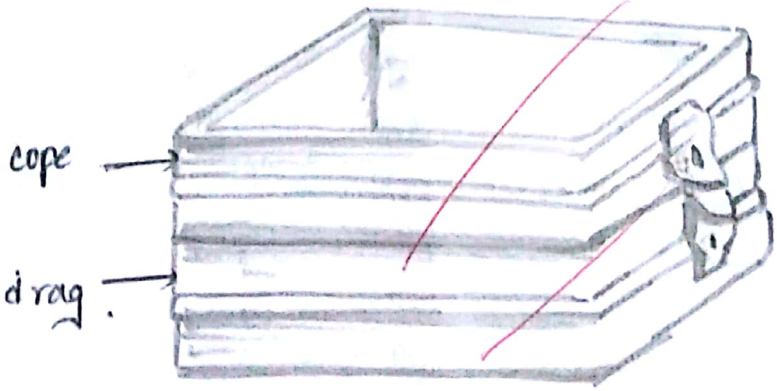
Vent rod → This is a type of metal rod. This is used to make small holes. These holes help in ventillating the harmful gases out. The small holes created by these vent rods helps the harmful gases to escape while the molten metal is being poured. Numerous pot holes are created, and the depth of those holes are upto the parting line.



Draw spike → The draw spike is a pointed steel rod. This has a loop at one end of it. There are ridges and grooves at the other end which can be inserted through the pattern. It is used to rap and draw patterns from the sand. The draw spike is threaded on the end to engage metal patterns.



Cope and drag box → Sand moulds are prepared in specially constructed boxes called flasks. The purpose of the flask is to impart the necessary rigidity and strength to the sand in moulding. They are usually made in two parts, held in alignment by dowel pins. The top part is called the cope and the lower part is called drag.



- Why is sand used for preparing a mould?

The principle material used in the foundry shop for moulding is sand. This is because it possesses the properties vital for foundry shop. It is easily available and less expensive. It has water holding capacity.

- What are the principle ingredients that are mixed with sand in order to make a good mould and why are they used?

The principle ingredients of moulding sand are →
a) silica sand grain b) clay c) moisture d) miscellaneous materials.

→ Silica sand grain

- Silica in the form of granular quartz, itself a sand, is the chief constituent of moulding sand.
- Silica sand contains from 80 to 90 percent silicon dioxide and is characterised by a high softening temperature and thermal stability.
- It is a product of the breaking up of quartz rocks or the decomposition of granite, which is composed of quartz and feldspar.
- The feldspar, when decomposed, becomes clay (hydrous aluminium silicate).
- However, silica sand grains impart refractoriness, chemical resistivity, and permeability to the sand.
- They are specified according to their average size and shape.

→ Clay

- Clay is defined as those particles of sand (under 20 microns in diameter) that fail to settle at a rate of 25 mm per minute, when suspended in water.
- Clay consists of two ingredients: fine silt and true clay.
- Fine silt is a sort of foreign matter or mineral deposit having no bonding power. It is the true clay that imparts necessary bonding strength to the mould sand, so that the mould does not loose its shape after ramming.
- True clay is found to be made up of extremely minute aggregates of crystalline, usually flake-shaped, particles called clay minerals.
- Most moulding sands for different grades of work contain 5 to 20 percent clay.

→ Moisture

- Moisture, in requisite amount, furnishes the bonding action of clay.
- When water is added to clay, it penetrates the mixture and forms a microfilm which coats the surface of flake-shaped clay particles.
- The bonding quality of clay depends on the maximum thickness of water film it can maintain.
- The bonding action is considered best if the water added is the exact quantity required to form the film.
- On the other hand the bonding action is reduced and mould gets weakened if the water is in excess.
- The water should be between 2-8 percent.

→ Miscellaneous materials.

- Miscellaneous materials found, are oxide of iron, limestone, magnesia, soda and potash.
- The impurities should be below 2 percent.

• Describe the following terms in relation to a mould.

a) runner — The runner is present down to the pouring basin. Actually the poring basin is made a bit away from the pattern. So, a channel in cut inside the mould, starting from the bottom of the pouring basin up to the pattern. The runner is the part through which the molten metal reaches the pattern.

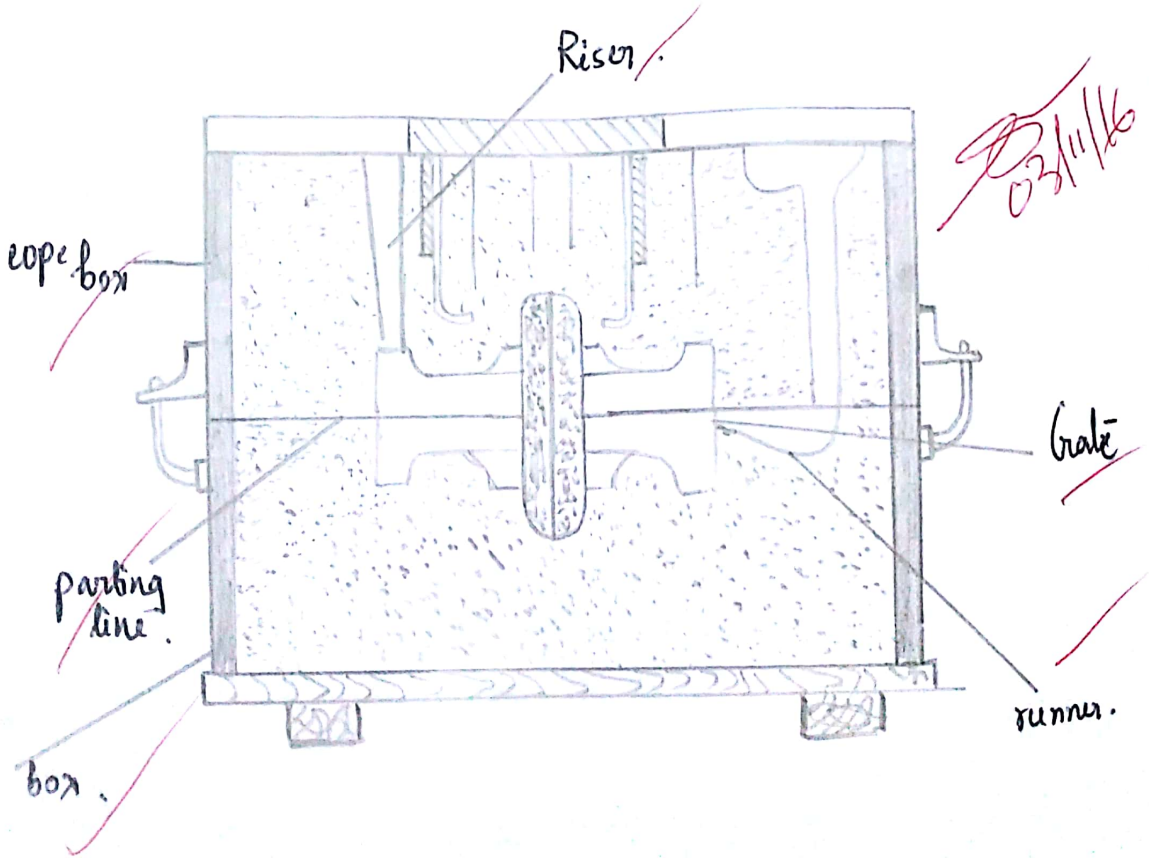
c) riser — Riser is the hole through which the liquid Al comes out after the pattern is completely filled with the liquid metal. Riser is made touching the pattern so that it gives just the necessary level of the rise for the pouring liquid metal.

d) vent holes — The mould is vented by striking it with a fine stiff wire at numerous places. The vent holes should not reach the pattern by 15 to 20 mm as otherwise they may spoil the mould. Moreover, the metal may run into vent holes while pouring. These vent holes permit the escape of gases generated in the mould when the molten metal comes in contact with moist sand.

e) Gate — Gate is the front portion of the runner. The depth of a gate is generally lesser than the average depth of the runner. This is because, the lesser depth slowers the entry of liquid metal, giving it more closeness to perfection.

- Draw typical green mould sand and label the following

a) cope box b) drag box c) Runner d) Riser e) parting line.



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