Experiment Number 4

Study of the effect of rise in temperature and clay content on the hardness of clay bounded sand

The essential difference between dry sand and green sand moulding is that the moisture in the moulding sand is removed prior to pouring the metal. Dry sand moulding is more applicable to medium and large sized castings than to small sized castings. In dry sand practice the sand moulds are dried at ~ 100°C or above before being cast. Dry sand strength is the maximum strength of a moulded sand specimen that has been thoroughly dried at 100°C to 105°C and cooled to room temperature. Some of the features of dry sand mould are:

a. Dry sand moulds are stronger and more rigid than green sand moulds.
b. They can withstand more handling.
c. Dry sand moulds can resist more static pressure of molten metal which may cause green sand moulds to deform and swell.
d. These moulds may be exposed to the atmosphere without any detrimental effect. Such exposures may be necessary for placing large number of cores.
e. Shelf life of these moulds is better than green sand moulds.
f. Castings made from dry sand moulds have generally lesser gas related defects than castings made by green sand practice.
g. However the cost of casting made by dry sand practice is more compared to castings made by green sand practice.

Experimental Procedure

1. Weigh **800 gm** of dry clay free sand.
2. Add **32 gm** of bentonite (for 4 % clay mixture).
3. Mix clay and sand for 2 minutes.
4. Add **40 ml** (5%) water.
5. Mix sand clay and water for 3 minutes.
6. Prepare 5 standard test specimens with the sand mixture.
7. Place 4 specimens in the oven at ~150°C.
8. Test the Green compressive strength of 1 specimen in universal sand strength testing machine.
9. Test the Dry compressive strength of the 4 specimens after heating for
   a) 5 minutes b) 10 minutes c) 15 minutes d) 20 minutes
10. Repeat the experiment with **48 gm** (6%) and **64 gm** (8%) clay mixture.
11. Plot strength vs heating time and discuss the results.

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