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"UTILISATION OF LATERITE SOIL IN MANUFACTURING OF BRICKS"

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1] ABSTRACTION

House is the third need of human in the world. While considering about India the population is increasing day by day which required Food, Cloths & shed / house for living. Affordable housing is needed in many countries of the world especially the developing ones. Building material makes up for 75%of the total cost of construction. The high demand for housing has increased the use of conventional building material which causes various environmental problems. To address these situations, attention has been focused on low-cost alternative building materials using industrial, agricultural, and natural wastes. Using the waste as substitute raw material in manufacturing of building products is an innovative way of waste utilization. The laterite soil is a waste product in laterite stone quarries. As we know that gov. banned on digging of sand and soil. So, this waste material can be effectively used in manufacturing of bricks. The laterite soil was collected from Ratnagiri (Kokan). Bricks of 10% cement and varying percentage of laterite soil (70%, 50%,45%,40%) and waste foundry slag (20%,40%,45%,50%) of bricks were prepared and tested for compressive strength in compressive testing machine and water absorption test for 28 days. We notice that, the best quality of bricks with high quality strength were obtained for mixed proportion of (40% laterite, 50% WFS, 10% cement) By this study, we concluded that addition of excess waste foundry slag increases the compressive strength of bricks.

2] INTRODUCTION

A house is one of the major amenities for the human being everywhere in the world. Different types of materials and methods are adopted for constructing a house or a building. Asfar as country like India is concerned, low-cost materials and its availability is the main factor controlling the selection of material and mode of construction there are different materials with different composition and properties which are used to construct a wall. The functions or duties of the wall, which are either load-bearing or framed structure, determine its construction materials types such as various types of bricks, blocks, partition boards etc. In olden days mud walled houses were used by poor people in rural areas. In ancient days natural stones is used as a walling material. He stones used for masonry construction must be hard, tough and free from cracks, sand holes, and cavities. The selection of stone for particular work is dependent on the availability of the stone and the importance of the structure. The common stones used for masonry construction are limestone, sandstone, granite, marble, laterite, etc. No construction is possible without brick since many centuries' bricks have provide the basic material for construction, they are utilizing in building construction.

Characteristics of laterite soil:

1. The laterite soil is slightly red in color
2. These soils are coarse or rough in touch. They are porous as they allow water or air to pass through it.
3. Due to intensive leaching, laterite soils are not so fertile by themselves.
4. The significant features of the lateritic soils are their unique color, poor fertility, and high clay content.
5. Lateritic soils have the advantages of good porous properties.

Fig1. ATERITE SOIL

Fig 2. WASTE FOUNDRY SLAG

Fig 3. CEMENT

3] LITRATURE REVIEW

Emmanuel A Okunade (2008), Study on bricks using laterite soil:

Different sample mixes were obtained by mixing the 70:30 parts by weight laterite – clay blend with varying proportions of saw dust and wool ash admixtures. The density of bricks made with the addition of sawdust and wood ash decreases whereas the compressive strength of the sample made with 10% wood ash and 0% saw dust show higher compressive strength than the control mix.

Gaurav Keshav M-tech in Structural Engineering (July 2015), Study on Fly ash Mixed Laterite-Cement Bricks:

In this study, the results of experiments conducted for various percentages of laterite soil and fly ash mixed with 5% and 10% of cement are discussed. The main objective of this study is to obtain a best percentage of fly ash that can be added with soil and cement as stabilizing agent to manufacture bricks at a low cost. Hence bricks in different fly ash, soil and cement mix were stabilized.

From all this research papers we studied that if mixed proportions are 10% OPC, 1.5% MgO, 1% coir fiber used for manufacturing of laterite bricks gives compressive strength is 10.53 N/mm2 which is maximum. When 10% of cement and laterite soil is used then it gives compressive strength 3.4 N/mm2 which is minimum.

4] METHODOLOGY

* METHODOLOGY FLOW CHART OF METHODOLOGY

- Proportioning of mix
- Casting of brick
- Lab test on bricks
- Field test on brick
- Result analysis
- Conclusion

5] CONCLUSION

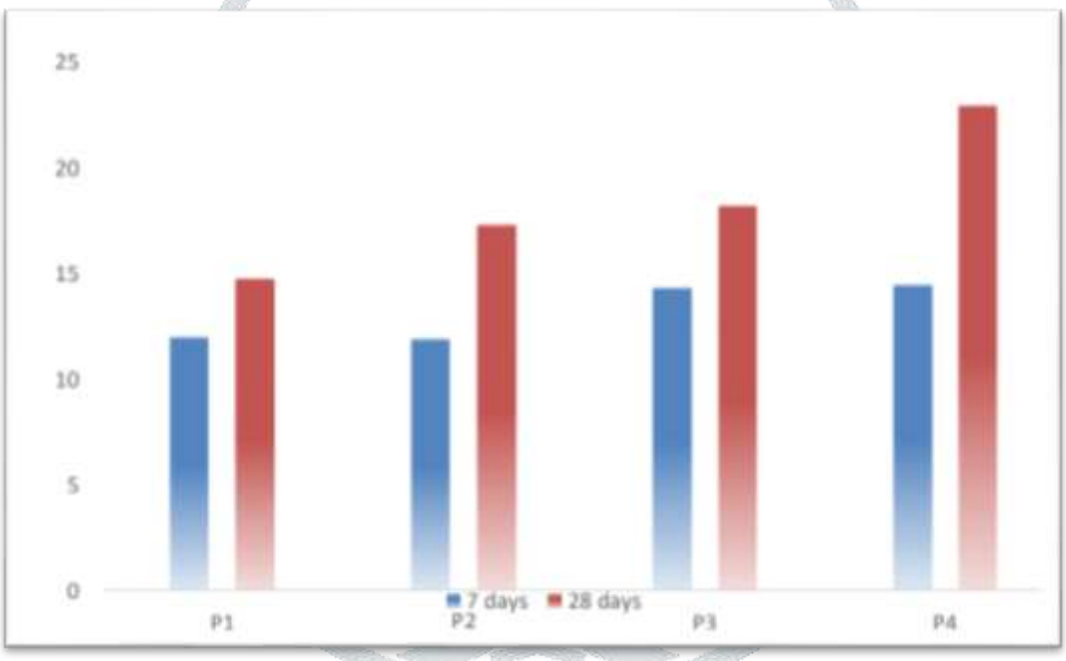
- For the effective result, the maximum compressive strength is 23.91 N/mm2 (class designation 20) obtained for the mixed proportion of laterite soil equal to 40% waste foundry slag equal to 50% and cement equal to 10%.
- Water Absorption result is 6.5 %. (Water absorption shall not be more than 20%).
- Addition of excess waste of foundry Slag increases the compressive strength of brick.
- Addition of desired quantity of waste foundry slag can result better bond of raw material and give better finished product which sharp and fine edges.
- When we add more waste foundry slag then the color of brick is light brown in color.

6] FUTURE SCOPE:

To Reduce the weight of bricks and increases the compressive strength of bricks using different combination of materials. Partial replacement of material as per cost economy and properties.

7] RESULT:

1) Compressive Strength Test



COMPRESSIVE STRENGTH TEST		
PRAPORTION	COMPRESSIVE STRENGTH (7 Days) N/MM^2	COMPRESSIVE STRENGTH (28 Days) N/MM^2
P1	11.96	14.71
P2	11.85	17.25
P3	14.28	18.19
P4	14.41	22.9