



International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 3, March 2018

Preparation of Bricks Using Construction Demolition Waste and Sludge

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ABSTRACT: The disposal of sewage wastes comprises as one of the major worldwide environmental problems as these wastes render the environment unfriendly. The growing demand for waste utilization has made solid wastes like sludge and demolition waste an essential composition of this study. The possibility of reduction of the production costs provides a strong logic for use of this waste. Generally sludge, bio degradable materials are dumped in the land, and they decompose over the period of time. This study involves the usage of sludge, construction and demolition waste as an essential ingredient. The sludge was checked for its physical characterization such as bulk density, compressive strength and chemical properties such as water absorption percentage, presence of toxic metals such as Pb, Zn, Cu and Fe for the commercial purpose. The study was performed by using different ratios as 3:2:2:3, 3:2:3:2, 2:3:2:3 of fly ash, cement, sludge and demolition waste respectively for making brick samples. The test results showed a common trait that with the increase in content of sludge, the strength decreased.

KEYWORDS: brick kiln, construction and demolition waste, curing, environment, sludge

I. INTRODUCTION

Construction and demolition waste are usually found whenever any construction or demolition activity takes place such as construction of bridges, flyovers, roads etc. it comprises mostly of inert and non- biodegradable material such as sand, gravel, concrete, metal, plastic, glass, etc. Demolition wastes are heavy, bulky and have high density and take up loads of land and space. So what if try recycling of these wastes.

These wastes can be used as landfill, base or sub base in road construction, embankment fill, and railway ballast and most importantly in aggregate replacement method for the formation of recycled concrete.

Sludge as we know are the waste material from any source, be it Industrial Waste or Municipal Waste. For waste water sludge or any other kind of sludge we know there have been many attempts made to incorporate these wastes with other materials into the production of bricks, for examples, rubber, limestone dust, wood sawdust, processed waste tea, fly ash and polystyrene.

Utilization of sludge in making of light weight, artificial aggregate and cement like properties is a win strategy as it not only recycles the waste product, but also alleviates the problem of waste disposal. Recycling such wastes by incorporating them into building materials is a practical solution for pollution problem.

Importance of Construction & Demolition Waste:-

Construction and demolition wastes need to be handled and disposed of properly, so that the aesthetics of the place is maintained. Landfill method is not the most efficient method for the disposal, as precious land is used up as landfill site. Also, with the growing demand, landfill sites are getting more difficult to manage. Development of a novel method for the disposal is required so that these can be utilized as construction materials, thereby lowering the price of construction and making low income housing possible.

The various importance of construction and demolition waste are as follows:

Preserve the natural resources: so as to preserve the natural resources like fine particles (river sand) Shortages of dumping sites: The major important thing Land gets wasted due to dumping of these wastes Reducing the construction cost: and also to reduce the construction cost thus resolving housing problems faced by the low income society of India. Ingredients: The very basic solid coarser aggregates Ingredients are available already in this waste.



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Importance of sludge:-On account of its high organic content and good wettability, sludge makes for an ideal additive to the clay-shale mix of bricks. So the various importance of sludge are:-In many ways sludge is the ideal additive to the clay-shale mix of bricks. How can that be? Because it is an organic material with the added advantage of being wet. Organic additives improve laying qualities of bricks. From the mason's point of view, pure clay makes for a less-than-ideal brick. They accepted mortar more readily, providing a suction that held the brick in place while the mortar began to set.

Investigation showed that these bricks were lighter and slightly more porous, the result of organic "contaminants" in the original clay. When fired, the organic material burned up, leaving tiny voids throughout the brick. It has become a common practice to include some organic materials in the clay mix. For most though not all brickmaking. Sawdust and coal fines are commonly used, according to Donald Agee, plant manager for the Maryland Clay Products brick company, which has made approximately half a million of the experimental sludge bricks.

II. PROBLEM STATEMENT

The investigation aims at comparing the performance of bricks made of waste materials like cement, sludge (sugarcane waste), Fly ash and Demolition waste with respect to design of bricks designed using soft clays. The performance of our design Brick will be compared with conventional brick.

III. METHODOLOGY

Materials:-

Waste material:- Waste may be defined as an unwanted material generated after the manufacturing process of industrial, or from agriculture, or from house hold activity. It is the discarded material which essential requirement of disposal. Waste causes many nuisances in the environment. It produces the many type of viral or bacteria or infection for the human and animal which create bad effect on health.

Demolition waste:It is waste debris from destruction of a building. The debris includes wood brick, concrete steel bars, masonry, rocks, gravels, etc.

Fly ash:-It is coal combustion product composed of fine particles that are driven out of the boiler with flue gases.

Sugarcane waste: In the sugar mills, sugar is produced through several processes and yields many solid waste in the production. The major by-product of the sugar industry are bagasse, molasses and pressmud press cake. Pressmud is the by-product obtained from the clarification process of sugarcane juice, raw juice has nonsugar contaminants are removed using a mixture of chemical reactants such as sulfur and li.

IV. RESULTS

Sr. No.	Ratio	Compressive strength (N/mm ²)		Water Absorption	Density gm/cm ³
		7 Days	14 Days		
1	3:2:3:2	0.6	1.1	16	1.20
2	2:3:2:3	0.9	1.4	14	1.30
3	3:2:2:3	0.7	1.0	13	1.15
4	2:3:3:2	0.9	1.4	16	1.30
5	1:2:4:3	0.3	0.6	17	0.80
6	3:1:2:4	0.4	0.7	12	1.10

Table. 1: Size of bricks: 230 x 155 x 100 mm Efflorescence: No Acid reaction.



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V. CONCLUSION

The waste materials are used in an effective way for making bricks. The environmental pollution also reduces. Bricks manufactured using sludge are light in weight. As percentage of sludge increases water absorption increases. Brick made with ratio 2:3:3:2 gives high strength compared with others.

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