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Experimental Investigation on Making of Plastic Brick

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Abstract: *The rate of urbanization has led to increasing plastic waste in generation. This is increasing has plastic waste, in plastic bags, bottles etc. The present based on waste utilization in brick manufacturing has been studied. As per the statically study of post-consumer plastic waste 14,000 tons per year in India in that waste only 40% were recycling every year. Remaining 60% plastic waste are being land fill and floater in sewage even surface water bodies. So then the Progress on in solid waste managing resulted in replacement of construction materials as a replace with to conventional materials similar to brick. The mix proportions used to plastic binding martial are used through the various mixing of 0%, 5%, 10%, and 15%. To preserve the surroundings, efforts are being made for reprocess unlike wastes and utilized them in assessment further function. In this article, here position on making and utilization of both non-hazardous and hazardous solid wastes in India, their reprocess potentials and ecological suggestion are testimony and discuss in detail. Finally using the waste plastic materials recirculation, as well as to the protection of the environment.*

Keywords: Plastic Bricks

I. INTRODUCTION

The World-Wide Scenario of Human Health and Disease are In over Risk Because Of the Population Development and Polluted Environmental in The Form of Land, Air, and Water by using of plastics. Every day at present India is produce 15,500tonnes of plastic waste is being engendered per annum outcome is through manufacturing, mining, and other processes.

In this study of progress is plastic waste replace to the construction materials like as bricks, paver, tiles, sewer pipe and cement etc, they for this article, here position to making and utilization of plastics in both hazardous and non-hazardous solid waste management of in India. The generous expansion the use of plastic waste is experimental all over the world in past years, which has leads to enormous quantity of plastic manufacturing good waste. This waste is not ecofriendly and will continue in a landfill lacking of difficult to environment pollutions and problem. So we are recycling to use again of this plastic waste. Plastic are tough and degrade very slowly. Since the science the 1950s, one billion tons of plastic have been useless and may preserve for most of even thousands of years. If brick is by most generally used for manmade building construction materials.

The advance brick manufacturing have paved way for the reutilization of waste materials in building bricks which help to prevent ecological contamination even as part of the design of more efficient building. The plastic brick is has developed into progressively most trend investigation of over the past 20 years. Due to the quantity of world wide, the grow thing of huge amount of plastic has return into a most important waste problem. Keeping in view of safe disposal issues of plastic waste, it is utilized in brick study and experimental by various researchers. They have worked out of use to plastic in brick as partial replacement of fine aggregate. The test was conducted of various tests of samples casted specimens of by using plastic in the laboratory to analyze the various mix properties from normal brick. The behavior of brick study about Unger various combination mix of plastic waste material with regards to effect of various brick properties. The paper is discussed about utilizing various plastic materials in their brick.

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1.1 Plastic Brick

Metals in general have a high surface energy and are easier to bond with brick, whereas plastics have a lower surface energy & are harder to bond with brick. Hence, the decrease in compressive strength has been absorbed as waste shredded plastic content increases in the brick mix.

1.2 Replacing Plastic Brick

Brick being the widely used construction material in the world estimated up to 11 billion metric tons every year. Typical brick ingredients are cement, sand and Fly ash which are used universally for producing brick. Due to the great utility of brick, with the passing of each day these materials are getting deficient thus demanding for the alternatives. It is off course a matter of serious concern for the civil engineers who are on the search of suitable materials which can fully or partially replace the typical construction materials.

1.3 Characteristics of Waste Plastic

- **Tensile strength:** The tensile strength or the toughness of the plastics are dependent on the materials that are used in the production of the plastic. Usually, the tensile strength or the toughness of the plastics are less when compared to the alloys such as steel.
- **Lightweight:** They weigh less than that of the metals which makes their transportation easy or carrying them from one place to another becomes easy.
- **Reactivity towards chemical:** When plastics are compared with natural polymers such as cotton, wool, etc, plastics are not affected by the acids and alkalines.
- **Appearance:** Usually plastics are transparent and can be coloured to desirable colours. Also, they can be moulded into shapes depending on their usages.

1.4 Objectives

- The main target of this study is to analyze the carbon dioxide free cementitious material, various properties and their effects on Geopolymer brick.
- The efficient usage of waste plastic in plastic bricks has resulted in effective usage of plastic waste and thereby can solve the problem of safe disposal of plastics, also avoids its wide spread littering.
- A Present Study aims at evaluating the Performance of Plastic for Bricks Use in Construction and Other application areas.
- As Properties for Plastic Bricks, the same have Been of Studied for Various Mixes varying % of Materials.

1.5 Scope

- The reduce the Co2 Emissions of Plastic Bricks.
- The Plastic are Using Show Many Problems, Effects Are Affected on Human & Animals. Plastic is a very Toxicity Materials.
- To Control the Environmental Pollution & Remove Waste Plastic on Society.

II. METHODOLOGY

The methodology which is adopted in this experimental study is discussed in this chapter has explained by a flow chart diagram Fig 1.

1. Collection of scrap polypropylene pipes and waste polyethylene bags from the locally.
2. Identification of portioning of plastic sand into a defined ratio of (1:2, 2:1, 2:2, 2:3, 2:4, and 2:5) for producing samples of plastic sand bricks.
3. Waste plastic was cleaned to remove all dust and other contaminants and cleaned plastic were kept to dry for 1 day.

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4. Polypropylene and polypropylene waste added into the heater in the ration of 1:1 and heated up to 180 ^{0}C.
5. Melting point of polypropylene is 160^{0}C and high-density polyethylene is 180^{0}c
6. Sands is added based on the desired ratios.
7. Mixture was mixed properly using steel rod and poured into the molds. Before pouring the mixture into the molds, the sides of the molds were oiled for easily removal.
8. Sample were kept for 24 hours for drying and removed from the molds.
9. After the curing, test done for the sample bricks in laboratory.

2.1 Flow Chart of Methodology

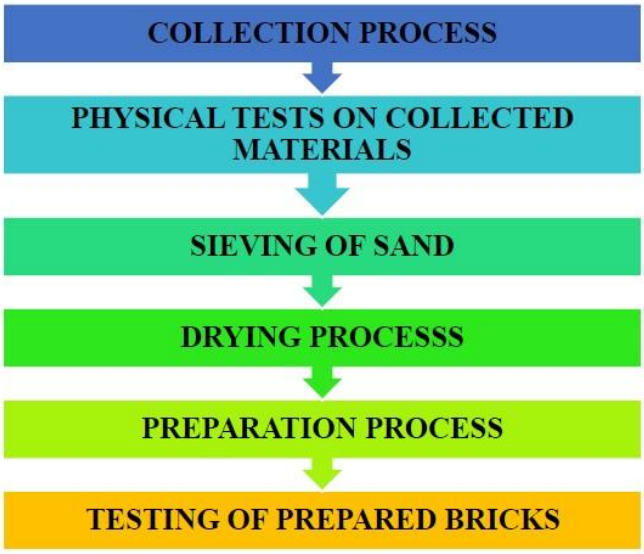

Figure 1

2.2 Preparation Process

Figure 2

III. Material Used

There are different types of materials used for the manufacture of plastic brick are,

1. Plastic
2. Sand

3.1 Plastic

Plastic is an essential component of many items, including water bottles, combs, and beverage containers. Knowing the difference, as well as the SPI codes, will help you make more informed decisions about recycling. When it comes to promotional giveaways, and even items we use around the house, there is no material more important than plastic. The same can be said for the items we use at the office. Most of our supplies contain at least a little bit of this material. In fact, humans have thus far produced 9.1 billion tons of plastic. For the sake of the environment, it's important to know the different types of plastic and their uses, as well as the resin identification codes found on each.

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Take a walk through your house or office and you're guaranteed to stumble across a variety of plastic products like water bottles and pens. No material is more commonly used in our everyday lives! It's easy to classify everything as simply "plastic." We are using LDPE plastic for our project because it takes less time for melting when compared with other of plastics.

3.2 Sand

Sand is composed of all kinds of rocks and minerals, so its chemical properties greatly vary. Most sand is made of quartz, which is largely silicon oxide. Physically, sand is made up of tiny, loose grains of rocks or minerals that are larger than silt but smaller than gravel.

Sand is a granular material composed of finely divided rock and mineral particles. It is defined by size, being finer than gravel and coarser than silt. Sand can also refer to a textural class of soil or soil type; i.e., a soil containing more than 85 percent sand-sized particles by mass. The composition of sand varies, depending on the local rock sources and conditions, but the most common constituent of sand is silica (silicon dioxide, or SiO2), usually in the form of quartz. Sand is a non-renewable resource over human timescales, and sand suitable for making concrete is in high demand.
The sand passing through 4.75mm sieve is used in concrete. The collection and utilization of sand is as per the Indian standards of IS. Normally the river sand will used for making of paving

IV. Result and Discussion

4.1 Compressive Strength Test

It is the most common of all test of brick is the compressive strength test because of the intrinsic importance of the compressive strength of brick in construction. Three test specimens shall be made from each sample for tested. To the test specimens are placed compressive machine of capacity 2000KN. It could be seen from the figure that the compressive strength was reduced significantly by 15% when replacing of waste plastic

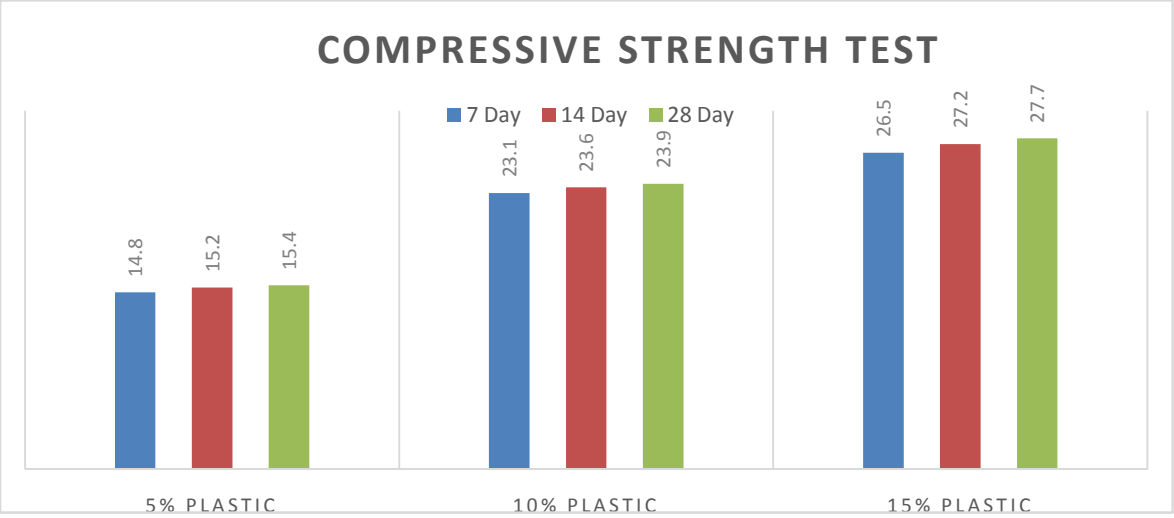

Figure 3

Si. No	% Plastic	Compressive Strength(N/mm^2)		
		7 Day	14 Day	28 Day
1	5%	14.8	15.2	15.4
2	10%	23.1	23.6	23.9
3	15%	26.5	27.2	27.7

Table 1

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Figure 4: Compressive Strength Test

4.2 Efflorescence Test

The efflorescence test showed an excellent performance on the plastic soil bricks. There were no formation of grey or white layer on the brick surface. From this test we can conclude that no traces of alkalis were presented in this plastic soil brick whereas the burnt clay bricks showed a slight deposit of alkali on the brick surface.

4.3 Hardness Test

In this test, a scratch was made on brick surfaces. This test was carried out for all proportion of bricks. While the scratch was made with the help of a finger nail on the bricks, no impression was left on the sand brick surface whereas the burnt clay bricks showed a light impression on the brick surface.

4.4 Soundness Test

In this test, two bricks from same proportion were taken and they were struck with each other. The bricks were not broken and a clear ringing sound was produced same as that of burnt clay bricks. So the bricks are good.

4.5 Impact Test

In this test, the bricks were made to drop from a height of 1m on one of its corner. The bricks were not broken or shattered and it indicates the brick are of good quality.

4.6 Advantage of Plastic Brick

- More economy.
- Low cost.
- Material easily available.
- Skilled labor not required.
- High bonding strength.
- High durability.
- More elastic modulus.
- Curing is not necessary.

4.7 Disadvantages of Plastic Brick

- The temperature above 200^{o}C Means Brick Was Melted.
- The Handlings are difficult and to wear safety production.

4.8 Applications (or) Uses

- Used to marine work.
- Used to water tank construction.
- Construction the walls and building.
- Used to sewer pipe construction.

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V. CONCLUSION

From the results obtained from these studies the following conclusions can be drawn:

The strength of the specimen of brick was summarized. The other brick test is depended on the materials used for the brick proportions with replacement of fine aggregate as waste plastic material.

- From the experimental investigation we found that the compressive strength and other brick test while compare with normal bricks strength behavior.
- The compressive strength of waste plastic brick proportion of various percentage strength is maximum strength of 27.7 N/mm² increased.
- The other test results are compared with plastic brick is good conditions and behavior.
- In this brick more than the normal brick all the air voids can arrest by the cracks to the brick. The cost of brick cost is reduced.
- If the environmental pollution reduced to direct and indirect manner. All the research investigation is doing on plastic brick has been given green original for using of construction of building.
- The method used to reduce the plastic and safe disposal. To control the global effects and environmental pollution.

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