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RESEARCH ARTICLE

WASTE PLASTIC BOTTLE BRICKS

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Abstract

In this project we try to overcome the problem associated with plastic waste. In India huge amount of plastics are used (almost 11kg per year) for various purposes such as for making of water bottle, soda bottles & bag etc. which are not disposable. Because of these various problems occurs so we use waste plastic bottles for making of bricks by the various ways which are discussed below.

After studying the problem we developed the effective way to overcome this problem. Bottle brick are light in weight and withstand high amount of load or pressure.

Introduction

In today's scenario where the world is developing, pollution is also a one of the major concern that is growing rapidly and the country is considered to be developed when its infrastructure grows.

While designing and making multistorey's (bricks & cements) are used which releases heat and increases pollution.

Environmental engineering develops many alternatives by using wastes, and plastic is one of them which can be used for construction by filling sand, gravels and wood particles into bottles.

As plastic is non-decomposable but taken into use as it is flexible, light in weight, cheap, can take shock loads, non-brittle.

Plastic is also beneficial for earthquake loading cases. Plastic is 20 times more load resistant than conventional bricks.

Materials Used

1. Plastic Bottles which is used for drinking water, soda, oil, milk, medicine etc. having different size are used for making the bottle brick. Plastic bottle are used for making brick due to its high tensile capacity, good chemical resistance and also high degree of impact resistance. The maximum temperature it can bear is upto 200 degree celsius.

2. Cementare used as a binder material and also it increases the strength of material and harden the structure.
3. Sand.
4. Water.

Methodology

The main objective of this research work is to develop an efficient way to utilise the waste plastic bottle which damage the ecological balance or environment. The waste bottle or rejected bottle are collect and store them after that brick making process were started.

Step-1. Firstly waste plastic bottles were collected of different size and washed them. Fill bottle with small plastic piece and sand and after that compact them with rod so it fully tight and no air gap.

Step-2. Now make the mortar with cement sand ratio of 1:3 with water cement ratio of 0.6.

Step-3. Make the mold of the required brick size. The mold were oiled with medium viscosity oiled before placing mortar.

Step-4. Place the mortar of 2cm thickness in the mold after that placed the filled bottle with proper arrangement. After that again placed the mortar of 2cm thickness to cover the bottle. Now compact them with tamping rod.

Result and Analysis

General:-

To analyze the compressive strength and the technical features of plastic brick, we will conduct the laboratory test and thus the brick sample will be taken to the laboratory.

Standard and nominal brick sizes in India:-

In India, according to recommendation of BIS, standard brick size is 190 mm x 90 mm x 90 mm. With mortar thickness, the dimension of the brick becomes 200 mm x 100 mm x 100 mm which can be also called as the nominal size of the modular brick.

Compressive /Crushing Strength of Bricks:-

Compressive strength of bricks are very unsteady, and may vary from 30 kg/sq. cm to 150 kg/sq. cm for hand-made burnt bricks, while compressive strength of machine pressed may have compressive strength as high as 450 kg/sq. cm, and even 500 kg/sq. cm. The minimum compressive strengths of burnt bricks tested flat-wise described are:

1. Common building bricks—35 kg/sq. cm.

2. Second class bricks—70 kg/sq. cm.

3. First class bricks— 105 kg/sq. cm.

4. Compressive strength of bricks, not less than 140 kg/sq. cm are graded as AA class.

The strength of brick decreases by about 25 percent when drowned in water. Strength of sun-dried bricks is from 15 to 25 kg/sq.cm Water absorption of bricks after 24 hours is shown as follows: 1. First class brick-20% 2. Second class brick-22% 3. Third class brick-25% Heavy duty machine made bricks should not absorb more than 5% of their weight.

Conclusion

- The technique of using waste PET bottles as bricks has become popular in low income communities around the world.
- Reusing the plastic bottles as the building materials can have substantial effects on saving the building embodied energy by using them instead of bricks in walls and reducing the CO2emission in manufacturing the clay Brick.
- PET Bottles also have a durability of more than 300 years which is more as compared to the standard bricks and these bricks are very thick.
- It is Eco-friendly as we make use of the waste materials in the project and which does not cause any harmful to the environment.

- 90% increase in load carrying capacity of EcoBricks was observed compared to conventional bricks whereas Composite Eco-Bricks and Eco-Brick Prism shows only 12 % increase in strength than the conventional one.
- Therefore, it can be used in low rise building, temporary structures and for compound walls and cannot be used for high rise buildings.
- From the test results it can be concluded that the strength of Eco-Brick is more when compared to the conventional one.
- Thus we can conclude that using the concept of EcoBricks is cost effective, energy efficient and commercially feasible.

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