

A STUDY ABOUT REPLACEMENT OF NON DEGRADABLE WASTE IN CONSTRUCTION MATRIX

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Abstract - In present days we are facing many pollutions day by day and also causing pollution. In that case one of the major thing that we cant solve the world's resource and energy challenges. Mainly plastics destroy and pollute our earth in major parts to resolve it our is helpful. Generally plastics are non-bio degradable, being the technologies improved to recycle the plastics in certain stage it cannot be recycled. In other side natural resource like soil are decreasing in the manufacture of bricks. In our project we used Waste rubber powder. After several trails in compression testing, we observed that it can withstand high pressure when compared to other type of bricks. In most of the area in our country this type of bricks are useful to decrease the pollution. In most of the rural areas that is people who still lives in mud houses, can use these bricks, it will not be destroyed during the rainy seasons and if there any damages occurred these bricks can be recycled and reused. Plastic bricks are cost effective than the other bricks. It is most economical solution present in the construction industry and it is also economical and environment friendly solution of the plastic wastes. Use of plastic is high in our daily life such as polythene bags, disposals, furniture's, packing food packets and other accessories. Plastic is vary in large and various types according to their chemical composition. So, to separation of plastic wastes and mainly big problem in front of us.

1. INTRODUCTION

Today, India is the second fastest growing economy in the world. The Indian construction industry is an integral part of the economy and a conduit for a substantial part of its development investment and peoples rising expectations for improved quality of living. The construction industry is a global industry known for its generation of jobs at different skill and professional levels. In terms of value of its output, its global market is reported to be around \$1.5 trillion as on today. But only a small portion of it is distributed among its workers. In world labour market, construction workers are said to be over 100 million, constituting 6-7% of the world labour force.

1.1 MATERIALS NEEDED:

- Plastic bags, crisp bags
- Waste rubber powder
- Lime
- Oven

2. NON DEGRADABLE WASTE BRICKS:

A Brick is building material used to make walls, pavements and other elements in masonry construction. Traditionally, the term brick referred to a unit composed of clay. Now a days different types of bricks are available varying in material i.e., clay, flyash, sand lime, concrete, engineering bricks.

3. MANUFACTURING OF NON DEGRADABLE WASTE PLASTIC BRICKS:

- Required amount of plastic wastes, crisp bags, polythene bags, waste rubber powder and lime are weighed and mixed together.
- The mixture is placed in a mould of size 23*12*8.5 in m.
- The mould is closed using the metal plate on it top.
- Then it is kept in an oven for few hours until it is ready for mixing.
- After the mould is ready, it is taken out from the oven and made to cool down immediately.
- At last the plastic brick is being removed from the mould.

3.1. TESTS ON PLASTIC BRICKS:

- Size and shape test
- Compressive test
- Hardness test

3.1.1. SIZE AND SHAPE TEST:

The shape of bricks should be purely rectangular with sharp edges. Standard brick size consists length x breadth x height as 19cm x 9cm x 9cm.

3.1.2. COMPRESSIVE TEST:

Compressive strength test on bricks are carried out to determine the load carrying capacity of bricks under compression with the help of compression testing machine. Normally a brick withstands 105 kg/cm². But the brick made of plastic withstands more than that. It is proved in my research.

3.1.3. HARDNESS TEST:

A good brick should resist scratches against sharp things. So, for this test a sharp tool or finger nail is used to make scratch on brick. If there is no scratch impression on brick then it is said to be hard brick.

ACCORDING TO MY RESEARCH:

BY COMPRESSING,

S.NO	TEST	LOAD AT FAILURE (N)
1.	TRIAL-1	362970
2.	TRIAL-2	392400
3.	TRIAL-3	303800



4. TESTS RESULTS:

In My Research I Have Tested My Bricks In Various Kind Of Proportions, according to the test the results I got were mentioned below,

S. NO	PROPORTIONS IN %	COMPRESSIVE STRENGTH P/A(N/mm ²)
1	100%LDPE	5.422
2	100% clay brick	3.636
3	80% Industrial waste LDPE, 12% Waste rubber powder 8% CaCO ₃	4.73

5. FUTURE BENEFITS:

Plastic bricks give us hope and a way to work on innovative things related to the plastic and to try to invent some new civil engineering materials which shows some remarkable response in future industry and changes the thoughts of the researchers, users and industries. Such as, in going for Plastic wall in framed structures as a partition wall. Plastic benches in the parks. Plastic tracks for running and jogging in place of concrete or stone tracks. Research on Composition of plastic with fly ash, Quarry dust etc.

SOME OF THE ADVANTAGES:

- Allow recycling of waste plastic.
- If made with hollow cells, they can be filled with compacted dirt, increasing their potential utility for projects lasting several years.
- They can be used for insulation
- They should be sufficiently economical, with potential for easy recycling. Under submerged conditions they should last much longer.
- Exotic shapes are possible for decorative purposes.
- Overall cost of brick will be reduced.

DISADVANTAGES:

- Mortar would not stick
- Plastic may appear strong, but it would deform under pressure.
- As such they would have a limited lifespan due to degradation by UV.

- Extreme arctic weather would make them brittle. Or else, they would crack in several years due to thermal cycling.
- Skilled labors are required.
- When we are burning plastic for preparation plastic brick it emits toxic-gases into atmosphere.

6. SURVEY ON PLASTIC BRICKS:

Prepared a Questionnaire to the public about the usage of plastics and to the companies how the plastic bricks works in industry..? If it introduced as a replacement of clay bricks. Whether it is cost effective..?

7. CONCLUSION:

Plastic brick possess more advantages which includes cost efficiency, resource efficiency, reduction in emission of greenhouse gases, etc. Plastic brick is also known as “Eco-bricks” made up of plastic waste. Other wise harmful to all living organisms can be used for construction purposes. It increases the compressive strength when compared to brick. This work effectively converts waste plastic into useful building materials. Blocks, interlocks and also reduce the pollution faced by the humans are the building materials. From the compressive testing results we come to know that waste plastics when mixed with waste rubber powder and CaCO₃ will cause highest compressive strength than other bricks. This brick is economical. After several trails in compression testing, we observed that it can withstand high pressure when compared to other type of bricks. In most of the area in our country this type of bricks are useful to decrease the pollution. In most of the rural areas that is people who still lives in mud houses, can use these bricks, it will not be destroyed during the rainy seasons and if there any damages occurred these bricks can be recycled and reused. Plastic bricks are cost effective than the other bricks.

REFERENCES

- [1] Processing of Waste Plastics into Building Materials Using a Plastic Extruder and Compression Testing of Plastic Bricks Noel Deepak Shiri*, P. Varun Kajava, Ranjan H. V., Nikhil Lloyd Pais, Vikhyat M. Naik -2015
- [2] Bricks from waste plastic- Shikhar Shrimali. Civil Engineering, Neotech Institute of Technology Jan 2017
- [3] UTILISATION OF WASTE PLASTIC IN MANUFACTURING OF BRICKS AND PAVER BLOCKS January 2016
- [4] Utilization Of Waste Plastic In Manufacturing Of Plastic-Soil Bricks Puttaraj Mallikarjun Hiremath, Shanmukha shetty, Navaneeth Rai.P.G, Prathima.T.B , 2014
- [5] Manufacturing Bricks from Sand and Waste Plastics Larenlakpam Billygraham Singh NHPC Limited, Loktak,

Manipur. Loukham Gerion Singh Pongsumbam Boss Singh Suresh Thokchom* March 2017

BIOGRAPHIES



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