

**UTILIZATION OF PLASTIC WASTE FOR MAKING PLASTIC BRICKS**¹Lokesh Patil, ²Kiran Shipkule, ³Manish Patil, ⁴Udaysinh Survase, ⁵R.S.Kognole^{1,2,3,4} BE Civil, Tssm's BSCOER, Narhe, Pune
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ABSTRACT:- The plastic waste is the hazardous problem in today's world. This is most dangerous problem in front of humanity. The most hazardous type of wastes are HDPE and PTE and the plastic below 50micron is also causing a serious problem. These plastic mixed in the soil, it directly effects on fertility of the soil. Nowadays, the large amount of plastic is deposited into sea. This plastic wastes gives hazardous effect on the aquatic life and quality of seawater also polluted by this plastic. So, we try to finding efficient way to solve this problem of plastic waste. So, we added this plastic wastes into the bricks and create the bricks by using plastic wastes. It is most economical solution present in the construction industry and it is also economical and environment friendly solution of the plastic wastes.

Keywords: Plastic Waste, Water Absorption, Compressive Strength, Hardness, Efflorescence.

1. INTRODUCTION

Plastic is the very hazardous material and very difficult to decompose it is main problem in the world. 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.

Nowadays, In the world plastic deposited by burning procedure. They emit large amount of hazardous and toxic gases. These gases effect on the human health and also living animals. Human suffers by the toxic gases such as cancer, high blood pressure, Asthma .etc.

We are not completely able to stop the use of plastic but we are able to recycle and reuse it by many ways and minimum effect on environment. We use such recycle plastic in the various industries such as construction, transportation, manufacturing .etc.

In construction industry, larger cost of project is include in materials up to 60% to 70% of the total cost of the project. So, construction industry large amount of bricks are used and they available in various forms such as clay bricks, concrete bricks, fly ash bricks and foam bricks.

In this project, we try to use wastes plastic to manufacture the bricks and increase the strength and achieve economy so the people can easily afford this type of bricks.

2. Literature Review

Due to increasing population, the demand of plastic materials and necessary requirement also increases. Brick is largest materials used in the construction industries and occupied in very large amount of materials of the project especially in residential projects. We use various types of plastic with various combinations to produce different type of bricks. We find the different properties of bricks by conducting various tests on it. Among them compression and water absorption test is most common test conducted on bricks by the various researches. But the use of such types of bricks is very limited in the industry. We need to convenience the people to use the such types of bricks and increase the use of it.

1. CRITICAL REVIEW ON TYPES OF BRICKS TYPE 14: PLASTIC SAND BRICKS : 1)MANISH KUMAR SAHU, 2)LOKESH SINGH: Volume- 5, Issue-11, Nov.-2017):- Brick is one of the most common masonry units used as building material. Due to the demand, different types of waste have been investigated to be incorporated into the bricks. There has been a considerable imbalance between the availability of conventional building materials and their demand in the recent past. On the other hand the plastic waste is abundantly available and the disposal of waste plastics is a biggest challenge, as repeated recycling of PET bottles poses a potential danger of being transformed to a toxic material and only a small proportion of plastic wastes are being recycled. Because of costly conventional recycling techniques, there has been an increased demand for more scientific and innovative technologies to effectively recycle these materials. This paper deals with recycling and manufacturing process, materials used as well as the testing method of plastic sand bricks.

2. Manufacturing And Testing Of Plastic Sand Bricks 1)Mr.N.Thirugnanasambantham, 2)P.Tharu nKumar, 3)R.Sujithra, 4)R.Selvaraman, 5)P.Bharat hi:- Plastic is a non-bio-degradable substance which takes thousands of years to decompose that creates land as well as water pollution to the environment. The quantity of plastic waste in Municipal Solid Waste (MSW) is expanding rapidly. It is estimated that the rate of usage is double for every 10 years.

The Plastic usage is large in consumption and one of the largest plastic wastes is polyethylene (PE). The utilization of earth based clay material resulted in resource depletion and environmental degradation. As amount of clay required for brick is huge, in this project these waste plastics are effectively utilized in order to reduce the land space required to dump these wastes. This creates the prevention from various harmful diseases. Polyethylene (PE) bags are cleaned and added with fine aggregate at various ratios to obtain high strength bricks that possess thermal and sound insulation properties. This is one of the best ways to avoid the accumulation of plastic waste. It also helps to conserve energy, reduce the overall cost of construction and hence in this project, an attempt is made to manufacture the plastic sand bricks by utilizing the waste plastics.

3. Objectives

- To develop an efficient way and to effectively utilize the waste plastics.
- To reduce the consumption of natural resources such as clay for the manufacturing of bricks.
- To minimize and reuse generation of waste plastic on the land and water to avoid land and water degradation and consequent pollution hazard.
- To produce cost-effective materials which a common person can afford easily.
- To reduce the plastic in waste streams saving non-renewable resources.

4. Methodology

First, we need to collect the plastic waste and separate it from other wastes. Second, we should dry the plastic waste if it is wet and has a content of moisture. We have to use dry plastic waste. Then, we crush the plastic waste in small particles. the small particles crush into fine size particles. Fine particles of plastic waste also heated on a furnace (Bhatti) till it is in a liquid form. we add the stone dust into melt plastic. We can mix it properly and make a mix. We poured the mix into moulds. Keep it the mould for dry.

4.1 USING DIFFERENT MATERIALS FOR PLASTIC BRICK-

Polythene
High density polymer (nylon66)
Plastic bottles (PET)
Plastic wastes
Plastic composite with other material
River sand(4.75mm)
Red soil Cement

4.2 DIFFERENT COMPOSITION WITH PLASTIC-

Trial 1 - Some small samples - Comp.1.Plastic Bottles Crush (50gm) +Red soil (50gm)
Comp.2.Plastic Bottles Crush (50gm) +River sand (50gm)
Comp.3.Plastic Bottles Crush (50g) +Stone crush (50gm)

Trial 2- Standard Size Bricks –
Comp.1 Plastic wastes crush (0.750kg)+River Sand(2.kg)
Comp.2 Plastic Wastes crush (0.750kg)+Red soil(2.kg)

4.3 Photos



COLLECTION OF PLASTIC WASTE



MELTING OF PLASTIC WASTE



COMPRESSION TEST ON BRICK



SECOND TRIAL BRICKS



COMPRESSION TEST ON BRICK



STANDARD BRICK AFTER REMOVING MOULD

5. Result

Laboratory Test- Curing Test-

SR.NO.	COMPOSITION	WATER ABSORPTION TEST (After 24 hr.)
1.	Comp.1.	0
2.	Comp.2.	0
3.	Comp.3.	0
4.	Red brick	5%

COMPRESSION TEST-

SR.NO.	COMPOSITION	COMPRESSION(KN)
1.	Comp.1.	15 KN
2.	Comp.2.	10.5 KN
3.	Comp.3.	13.50 KN
4.	Comp.4.	15.50KN
5.	Red brick	14 KN

LABORATORY TEST TRIAL 2

COMP	COMPRESSION	WATER ABSORPTION	SHAPE	SOUNDNESS	DURABILITY	HARDNESS
COMP 1	97.50KN	3%	standard size (190 mm x 90 mm x 90 mm)	not ringing bell sound and not break	Satisfied all criteria of durability	There is satisfied criteria of hardness.
COMP 2	26KN		Binding is not properly so shape not as per standard size	Not ringing bell sound and break	Saturation affect the durability	There is satisfied criteria of hardness.

7. Conclusion

1. Waste plastic, which is available everywhere, may be put to an effective use in brick making.
2. Plastic sand bricks can help reduce the environmental pollution, thereby making the environment clean and healthy.
3. Plastic sand bricks reduce the usage of clay in making of bricks.
4. Plastic sand bricks give an alternative option of bricks to the customers on affordable rates.
5. Water absorption of plastic sand brick is zero percent.
6. We conclude that the plastic sand bricks are useful for the construction industry when we compare with Fly Ash bricks and 3rd class clay bricks.

8. References

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