



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

# IJRSET

International Journal of Innovative Research in  
**SCIENCE | ENGINEERING | TECHNOLOGY**



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 13, Issue 5, May 2024

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

Impact Factor: 8.423

 9940 572 462

 6381 907 438

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# Plastic Brick Made from Waste Plastic

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**ABSTRACT:** Plastic is a very common material that is now widely used by everybody in the world. Plastic plays a predominant role in reusable in this era, as it is compact and light in weight. Common plastic items that are used are covers, bottles, and food packages. The great problem with plastic is its decomposition. Plastic is made of polymer chemicals and they are non-biodegradable. This means that plastic will not decompose when it is placed in earth. Though plastic is a very useful material that is flexible, robust and rigid they become waste after their use and they pollute the air and land. Recycling is processing use waste materials into new products to prevent waste of potentially useful materials. The increase in the popularity of using eco-friendly, low cost and lightweight construction materials in building industry has brought about the need to investigate how this can be achieved by benefiting to the environment as well as maintaining the material requirements and their standards. So, our project is to prepare plastic bricks to replace normal clay brick

**KEYWORDS:** Plastic, Bricks, chemicals, non Bio-degradable, eco friendly.

## I. INTRODUCTION

Plastic is a very common material that is now widely used by everybody in the world. Plastic plays a predominant role in reusable in this era, as it is compact and light in weight. Common plastic items that are used are covers, bottles, and food packages. The great problem with plastic is its decomposition. Plastic is made of polymer chemicals and they are non-biodegradable. This means that plastic will not decompose when it is placed in earth. Though plastic is a very useful material that is flexible, robust and rigid they become waste after their use and they pollute the air and land. Recycling is processing use waste materials into new products to prevent waste of potentially useful materials. The increase in the popularity of using eco-friendly, low cost and lightweight construction materials in building industry has brought about the need to investigate how this can be achieved by benefiting to the environment as well as maintaining the material requirements and their standards. From the advantages of plastic recycling procedure is used. For the production of plastic bricks is an optimal method for controlling the problem by decomposition of plastic waste and also it costs economical for the production of building materials. In this study, plastic waste from factories will be used to incorporate with cement and sand to produce sand bricks. The bricks will then be tested to study the compressive strength, efflorescence and water absorption. In the recent past research, the replacement and addition have been done with the direct inclusion of polyethylene, polyethylene terephthalate (PET) bottles in shredded form, chemically treated polyethylene-fiber, PET in small particles form by replacing natural coarse aggregate. Most of replacements have been done by volume calculation, and showed the decreased in compressive strength as the increased plastic waste. In this study, recycled plastic waste have been introduced in the form of crushed. The replacement of plastic waste material has been done by weight.

## II. RELATED WORK

**Muyen Z, Barna TN, Hoque MN (2016).** Strength properties of plastic bottle bricks and their suitability as construction materials in Bangladesh. *Progressive Agriculture* 27(3): 362-368.

“Study of plastic dust brick made from waste plastic” by **Ronak Shah, Himanshu Garg, Parth Gandhi, Rashmi Patil, Anand Daftardar (2017).** They used plastic dust as the main component of waste product which is the by – product of many industrial products such as PVC pipes and they have heated plastic dust at 220°C. The final product from plastic dust was tested for the compressive strength and it was observed as 6.66 N/mm<sup>2</sup> which is higher than conventional bricks (3-5 N/mm<sup>2</sup>).

“Plastic in Brick Application.” By **Siti Nabilah Amir & Nur Zulaikha Yusof (2018).** The studies showed the possibility of using plastic as binder with the aid of catalyst through depolymerisation of PET to replace cement. It was observed that a significant decrease in compressive strength is observed for more than 50% replacement of binder with

PET waste. With increased amount of PET, the softening point of the bricks produced was also increased. They used the different size of moulds like (150\*150\*150) mm, (200\*100\*100) mm etc.

**Hiremath PM, Shetty S (2014).** utilization of waste plastic in manufacturing of plastic-soil bricks. international journal of technology enhancement and emerging engineering research 2(4): 2347-4289

### III. METHODOLOGY

- To Prepare plastic bricks
- To vary the percentage of plastic in bricks to determine the strength performance
- To compare strength of plastic bricks with normal clay bricks
- Cost Compare in between plastic bricks and normal clay bricks



(a)



(b)



(c)



(d)



(e)



(f)

Figure a and b are moulds for making the plastic bricks

Figure c shows the preparation of molten in open hearth furnace



Figure d, e and f shows the compression test of rectangular plastic brick, normal clay cement brick and hexagonal plastic brick respectivel

IV. EXPERIMENTAL RESULTS

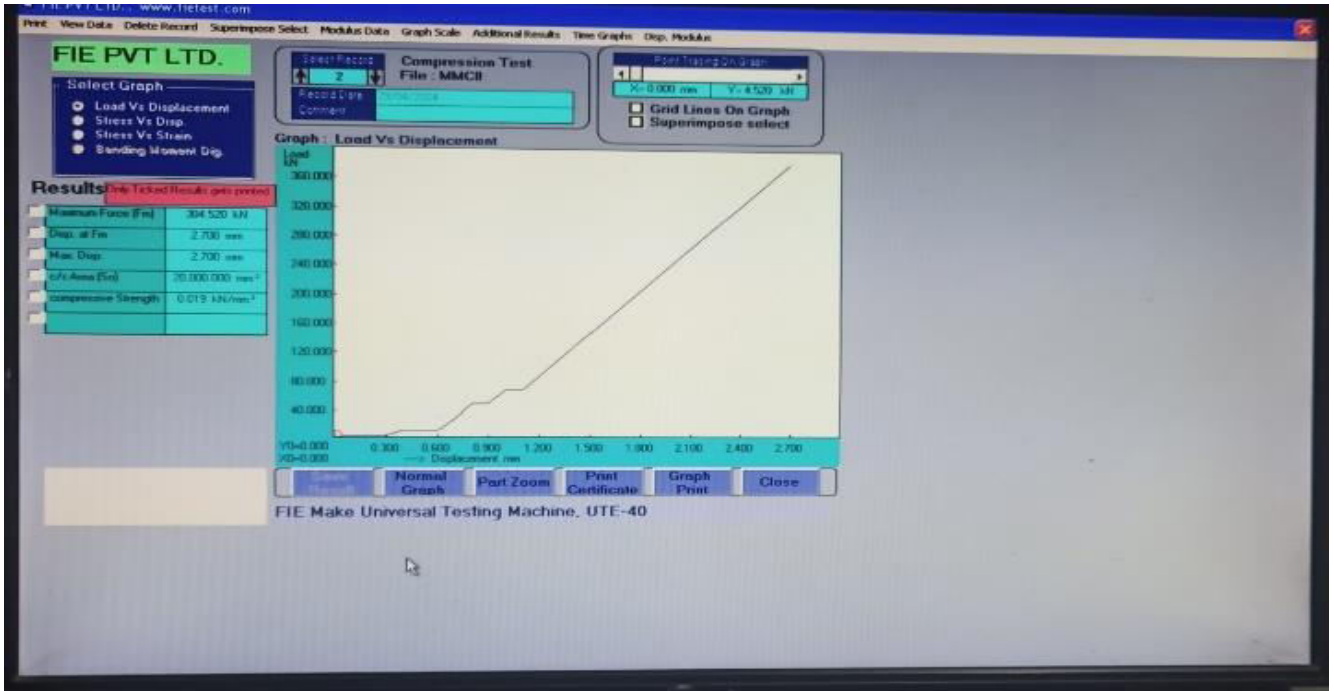


Figure (a) is normal clay cement brick graph

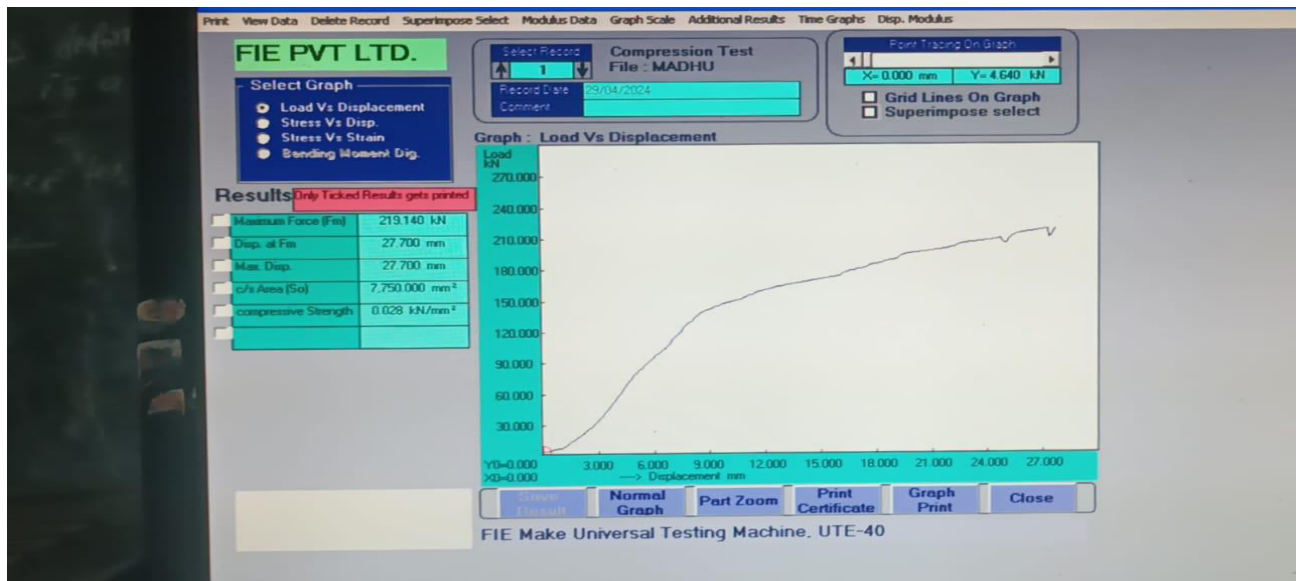


Figure (b)is rectangular plastic brick graph

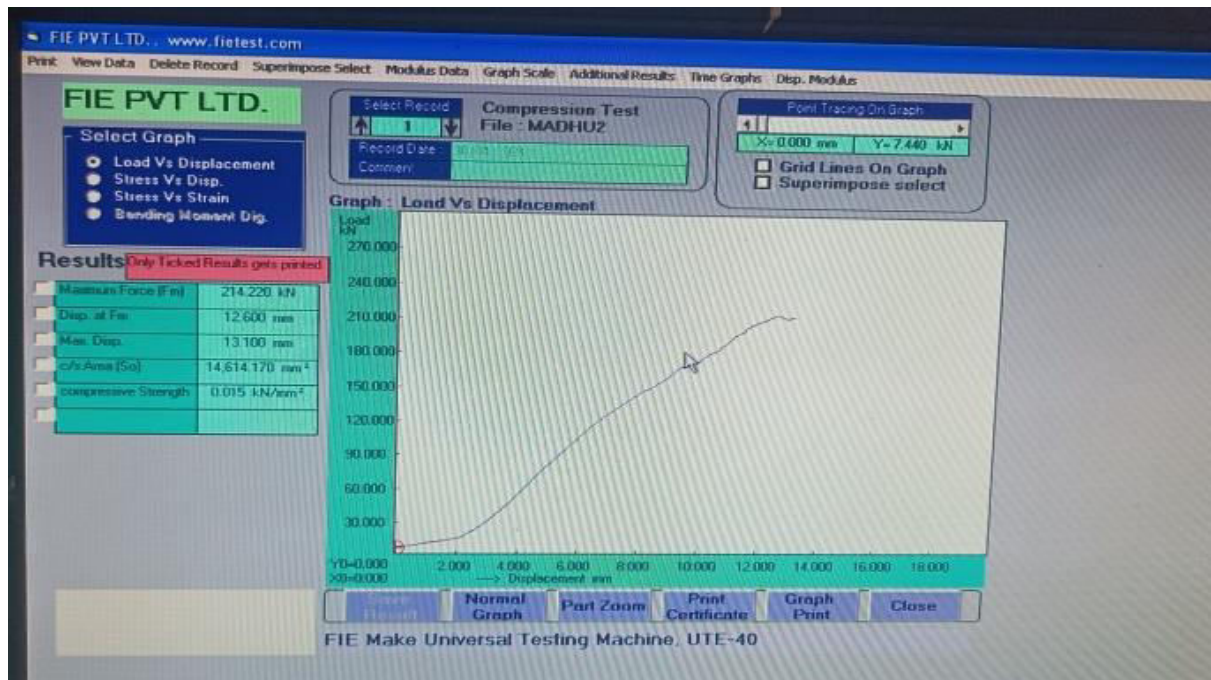


Figure (c) is hexagonal plastic brick graph

Fig a is normal clay cement brick graph

Fig b is rectangular plastic brick graph

Fig c is hexagonal plastic brick graph

From the experiment conducted we come to know that the ultimate compressive strength of the plastic brick is 19MPa, the ultimate compressive strength of the plastic rectangular brick is 28MPa and the ultimate compressive strength of the hexagonal plastic brick is 15 MP. From these results we come to know that rectangular plastic brick has maximum compressive strength.

### V.CONCLUSION

The Plastic sand bricks possess more advantages which include Cost efficiency, Removal of waste products thus abolishing the land requirement problem for dumping plastic, Reduction in the emission of greenhouse gases by the conversion of flue gases in to synthetic Oil etc., This method is suitable for the countries which has the difficult to dispose/recycle the plastic waste. The natural resources consumed for the manufacturing Of Plastic sand bricks are very much less when compared to its counterparts. Plastic sand brick possesses more advantages which includes cost efficiency, resource efficiency, reduction in emission of greenhouse gases, etc. Plastic sand brick is also known as “Eco-Bricks” made of plastic waste which is otherwise harmful to all living organisms can be used for construction purposes. It increases the compressive strength when compared to fly ash bricks & clay bricks. By use of plastic sand bricks, the water absorption presence of alkalis was highly reduced.

- Waste plastic, which is available everywhere, may be put to an effective use in brick.
- Plastic bricks can help reduce the environmental pollution, thereby making the environment clean and healthy.
- Plastic sand bricks reduce the usage of clay in making of bricks.
- Plastic sand bricks give an alternative option of bricks to the customers on affordable rates.
- Water absorption of plastic sand brick is zero percent.
- Compressive strength of plastic sand brick is 5.6 N/mm<sup>2</sup> at the compressive load of 96KN.
- 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.

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