

Plastic Bricks

Sachin Anant Kamble¹, Dnyandev M Karad²

^{1,2}Plastics Engg. (S.B.M polytechnic)

ABSTRACT

Plastic is one of the daily increasing useful as well as a hazardous material. At the time of need plastic is found to be very useful, but after its use, it's simply thrown away, creating all kinds of hazards. Plastic is not bio degradable, so it will continue to be hazardous for more than centuries. The idea of this paper is to find a use for this waste plastic scrap into something beautiful. The mixing of plastic with sand to create a new type of brick was put into thought. The plastic scrap used was leftover pieces of bottles, cans etc. So, as a trial the plastic was chopped into small pieces and heat was supplied from below. Into the molten plastic paste, sand was added in suitable proportions. The paste contained noting more than sand, plastic and thermocol. After thorough mixing, the paste was poured into a rectangular mould with standard brick dimensions. The paste took only 20 minutes to settle and harden. Cooling of the set was done by water cooling and after 5 more minutes the brick was extracted from the mould. It had a dark grey texture and increased weight by the initial analysis. Local brick testing methods were conducted such as free fall of the brick and scratch test. In both of those tests, our brick showed increased strength. The brick was subjected to compressive test, water absorption test. The results showed promise, that the Plastic Composite Brick was efficient than the clay brick and cement brick.

Keywords: *Compressive test, sand, Plastic, Water absorption test, hazardous material, molten plastics paste*

I. INTRODUCTION

Today, the generation of plastics waste is a measure issue, as the plastics is not biodegradable, the waste today can be produced wherever human footprints be existed, and remind him that they have not chosen the appropriate method of exploitation of the nature at the present time. The concept of manufacturing the ECO BRICKS was we utilise the plastics waste, which is generated by people door to door, also the construction industry take huge market in current scenario, utilization of waste in such construction industry may play major roll. Main important think while using the waste in ECO BRICK was it can not made by recycling but just burn to plastic waste without adding any additives and it can also be used for atleast 30-40 years in a construction industry

1.1. ECOBRICKS

Ecobricks are plastic drinking bottles packed with non-biological waste to make a reusable building block. An ecobrick is a plastic bottle stuffed solid with non-biological waste to create a reusable building block. Ecobricks are used to make modular furniture, garden spaces and full scale buildings such as schools and houses. Ecobricks are a collaboration powered technology that provides a zero-cost solid waste solution for individuals, households, schools and communities..

1.2. HISTORY

Eco bricking plastic waste into bottles is a method for dealing with waste that has popped up organically around the world. Various simultaneous pioneers have helped shape the global movement and refine the technology. Susana Heisse an environmental activist around Lake Atitlan in Guatemala in 2004. Alvaro Molina began on the island of Ometepe in 2003. The technique builds upon the bottle building techniques developed by German architect Andreas Froese (using sand filled Polyethylene terephthalate (PET) bottles) in South America in 2000.

In 2010, in the Northern Philippines, Russell Maier and Irene Bakisan developed a curriculum guide of simplified and recommended practices to help local schools integrate Eco bricks into their curriculum. Applying the ancestral ecological principles of the Igorots for building rice terraces, they integrated Cradle-to-cradle principles into Ecobrick methodology: ensuring that Ecobricks can be reused at the end of the construction they are used in. Through the Department of Education the guide was distributed to 1700 schools in 2014.

1.3 Construction

"Take a Plastic Bottle – Stuff it Full of plastic" Ecobrick.

It all that is needed to make an Ecobrick is a plastic bottle or container of some sort (including paper / laminate milk cartons) and a stick to stuff and compress a whole bunch of random everyday plastic materials inside of it. To start an Ecobrick, take a plastic bottle, rinse it out and leave it to dry. Use a stick to stuff it layer by layer with all of the plastics, non-biodegradable, and synthetics that would otherwise be thrown into a waste bin and eventually the Earth.

1.4 Context

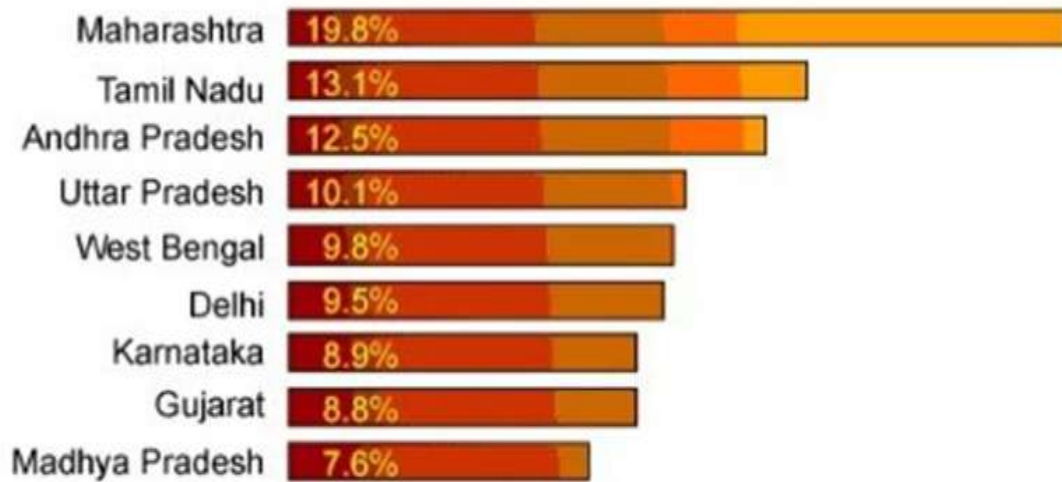
Plastics are made from petro-chemicals. These chemicals don't fit back into the ecologies around us. Scientific studies show that these chemicals are toxic to humans, we know this when we smell plastics burning. Eventually, plastics that are littered, burned or dumped degrade into these poisonous chemicals.. Eventually they reach us, causing birth defects, hormonal imbalances, and cancer. Even engineered dump sites are not a solution. Whether it is ten years, or one hundred, these chemicals will eventually seep into the biosphere, affecting our farms & families.

A tremendous amount of plastic waste litters our planet every year and its cost is huge. According to the UNEP 2014 Yearbook, plastic contamination threatens marine life, tourism, fisheries and businesses and the overall natural capital cost for plastic waste is \$75 billion each year. Since plastics don't biodegrade but photo degrade, plastics in the fields or water just break down into small pieces. These toxic pieces are then absorbed by plants and animals and come back to us, which leads to fatal consequences like cancer and birth defects. .

1.5 PLASTIC WASTE GENERATED IN MUMBAI

MUMBAI: Mumbai generates 7,500 metric tons of waste everyday, of which nearly 9% is plastic waste. The data, obtained from a recent report, indicates the city has not yet learnt its lessons despite the severe environmental impact of plastic, witnessed especially during the 2005 deluge where it choked drains, creeks and ultimately the city. The BMC's yet-to-be-released Environment Status Report for 2013-14 shows plastic accounts for around 675MT of the city's total daily waste generated in that year. In fact, the quantum of plastic

waste generated by the city has increased over the years. For instance, in 2010-11, 10% (650MT) of the total 6,500MT of garbage generated was plastic, which dipped the following year to 9% or 630MT of the 7,000MT of garbage generated. While in 2013-14 too plastic accounts for 9%, it has increased in absolute terms as the total waste generated is considerably higher.



State-wise E-waste Generation in India (Tonnes/year)

1.6 ANALYSIS OF BRICK FROM PLASTIC SCRAP

Composition of Bricks -eg. (16 +84 =100)

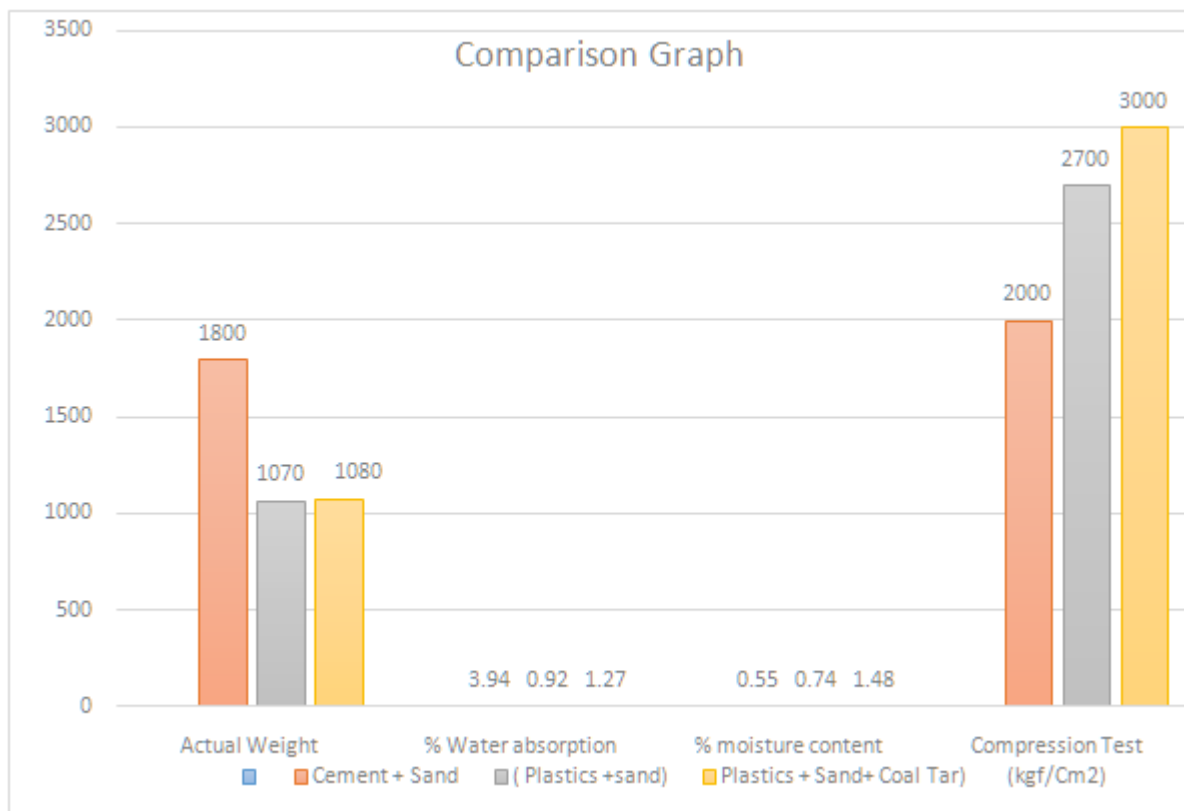
	COMPOSITION	WEIGHT(gm)	PERCENTAGE(%)
PLASTIC BRICK (weight 1.070kg)	Waste plastics	200	16
	Sand	1000	84
PLASTIC BRICK WITH DAMBER (Weight- 1.080kg)	Waste plastics	150	12
	Sand	1000	80
	Damber	100	08
CEMENT BRICK (Weight- 1.800 Kg)	cement	300	30
	Sand	1000	70

(Chart No-01)

1.7 RESULT ANALYSIS AND DISCUSSION

Sr.No	Types Of Bricks	Dimension		Actual Weight	Water absorption	% Water absorption	Weight after Heating	% moisture content	Compression Test (kgf/Cm2)
		length (mm)	Width(mm)						
1	Cement + Sand	100	50	1800	1874	3.94	1790	0.55	2000
2	(Plastics + sand)	100	50	1070	1080	0.92	1062	0.74	2700
3	Plastics + Sand+ Coal Tar)	100	50	1080	1094	1.27	1064	1.48	3000

(Chart No-02



Graph no.1

II. DISCUSSION: -

From Above chart no 1 & 2 and graph no 01 we said that less water absorbed by brick the grater its quality and compression strength. Good quality brick doesn't absorb more than 5 % water, also the combination of sand and Plastics give better results than cement & Sand. The issue to be discussed that if we add the coal tar into the combination of plastics & sand will get good compressive strength.

III. CONCLUSION

- 1) Use of Innovative Materials with sustainable application, plastics waste can have considerable benefits reducing environmental degradation
- 2) Light weight and high mechanical (Compressive strength) which lead to help in construction industry
- 3) Re-Using the plastics bottles as the building material can have substantial effect on saving the building embodied energy by using them instead of bricks in wall reducing the co2 emission.in manufacturing by cement reducing the % of cement
- 4) Cost effective as cost of cement is high compare to plastics waste.

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