



UTILIZATION OF PLASTIC WASTE TO OVER COME ENVIRONMENTAL POLLUTION

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ABSTRACT

Go green & go green is the prime demand of the environment. In this paper we will discuss the way to get green environment by utilizing the waste plastic. The use of plastic is essential today, so it is not the matter of concern today whether it can be used or not, the main matter of concern is the utilization of plastic wastes. For fulfilling this objective plastic waste should be converted into resources e.g. it can be used as fuel, landfill, in energy generation & for making road. Small business can be started to buy this plastic wastes to save the environment. Hence according to the environmental desire, by following the above discussed things with proper waste management we may hope about a clean and green environment.

Keyword: plastic waste, waste plastic oil, plastic road.

1. Introduction

Plastic waste is increasing due to increase in population, urbanization and development. The disposal of waste plastic has become a serious problem globally due to their non- biodegradability. Annually approximately 500 billion plastic bags are used worldwide. 60% of plastic waste is being recycled. Recycling of plastic is considered the next viable and technically feasible option to tackle plastic waste. To overcome these defects we can use the plastic in construction sector as a raw material in different ways.

Like by preparing bricks, tiles and can be used for paver blocks.

Plastic is one of the daily life useful and also a hazardous material. At the need of time, plastic is found to be very useful compare to other, it is simply go into garbage by people, and it creating all kinds of hazards problems. Plastic is non-biodegradable product and that remains as a toxic hazardous material for more than centuries.

2. Problem Specification

Plastic blocks are that provides a zero-cost solid waste solution for Individuals, households, schools and communities.

Blocks are Eco-friendly and Cost effective from concrete blocks.

The process of making paver block is essay and cheap.

3. RESEARCH METHODOLOGY

Materials and tools required

RAW MATERIAL: Sand, Cement, Plastic Waste Material

TOOLS/ EQUIPMENT: Plastic covers, bags and bottles, Fine aggregate (sand), Cement, Burning container, Module of standard size, Trowel and shovel, Tamping rod

Waste Types Waste plastic	Available as
Poly-ethylene terephthalate (PET)	Drinking water bottles etc.
High Density Polyethylene (HDPE)	Carry bags, bottle caps, house hold articles etc.
Low Density Polyethylene (LDPE)	Milk pouches, sacks, carry bags, bin linings, cosmetics and detergent bottles.
Poly propylene (PP)	Bottle caps and closures, wrappers of detergents, biscuit etc.
Urea formaldehyde	Electrical fittings, handles and Knobs
Polyester resin	Casting, bonding fibers (glass, Kevlar, carbon fiber)

Waste plastics

Plastics are commonly used substances which play an important role in most of every aspect of our lives. The widespread generation of plastics waste needs proper management. The highest amount of plastics is found in plastic bags and packaging (i.e. bottles, cups etc.), but they also are found in durables (e.g. tires, building materials, furniture, etc.) and disposable goods (e.g. medical devices). Diversity of plastics applications is related with their specific properties, low density, easy processing, good mechanical properties, good chemical resistance, excellent thermal and electrical insulating properties and low cost

(in comparison to other materials). Post-production and postconsumer plastics are utilized in a wide range of applications.



waste plastic

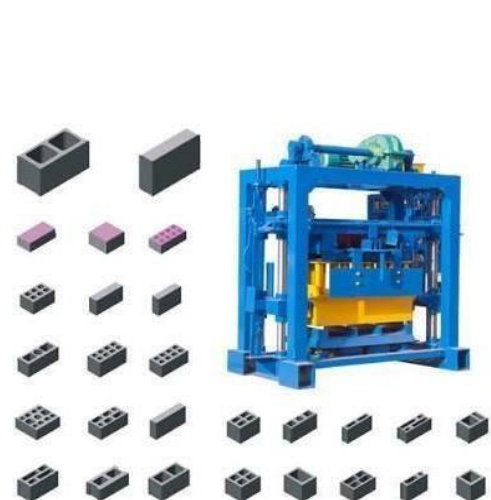


Sand

Sand

Natural river sand was used as a fine aggregate. The properties of sand were determined by conducting tests. The results are shown in test data of materials. The results obtained from sieve analysis are furnished.

S. No	Tests	Results
1	Specific Gravity	2.62
2	Bulk Density	1690 kg/m ³
3	Fineness Modulus	2.92



Different type of blocks and press machine



Moulds

Methodology

Unsorted waste plastic bags are taken directly from Reliable source. No further any treatment is required for bags.

Sand/crushed stone type material used regularly for construction or for improves strength of material purposes is taken.

The plastic waste is first heated in a closed container for heating cooking gas stove or heating furnace is used.

Melting point of plastic bags is approximately 105-110°C After some time of heating the plastic starts turning into liquid slurry form or a thick liquid is obtained whose approximate temperature is above 170.

Sand/ crushed stone and cement is added to this thick liquid material and mixed properly. Mixing is one of the important parts of this method because it mixed the mixture properly as it directly affects the strength of resulting blocks.

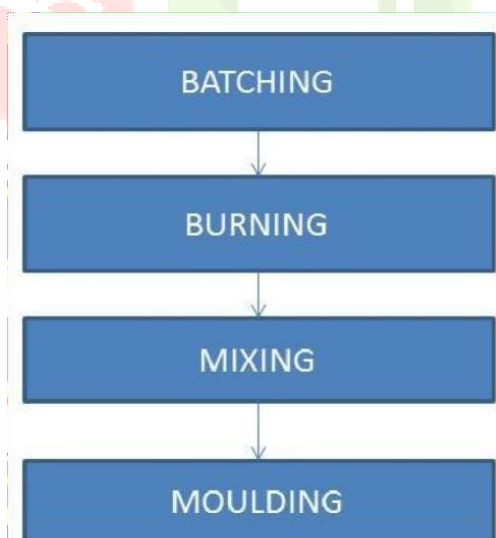
Mixing must be done with constant supply of high temperature to the mixture container.

Once the sand/crushed stone type material, cement and plastic fluid are uniformly mixed with each other, the hot mixture is transfer into moulds.

The mixture should be filled with proper compaction.

With the help of shovels and trowel we can fill the mixture in to mould properly.

In moulds the block is kept settling for 1day by placing at the atmospheric temperature.



Flow process

Batching

The collected waste plastic bags are washed with water and dried to remove the moisture inside the plastic and then check the weight .The sand were sieved by home sieve .The sand and the plastic bags were weighed in different proportions among which the plastic were go for burning process.

Batch No.	Waste Plastic (gm)	Sand (gm)
1	250	200
2	250	150
3	375	200
4	375	135

Burning

After batching the plastic bags were taken for burning in which the waste plastic bags are added one by one into the utensil for melting and convert it into a liquid slurry .The first step of heating process includes the arrangement of, supporting plate with stone, utensil and the required firewood to give constant temperature .



Burning process

The stones are arranged to hold the utensil and the firewood is placed in the gap between stones and plate, it is ignited .The utensil is placed over the setup and it is heated to remove the moisture present in raw materials

Mixing

Mixing of materials is require for the making of uniform and hard blocks. The mixing will need that the mass will convert homogeneous and uniform in color. Generally there are two types of mixing, Hand mixing and machine mixing. In this project, we have used hand mixing. The plastic bags are added one by one into the utensil, till the entire plastic content need for making blocks of one mix proportion is added into mixture .The mixture has very short time for setting bags are turned to molten state, now the sand is added into a slurry .The added sand is require proper time for mixing



Mixing process

Material	1	2	3	4
Plastic waste (%)	55%	62.5%	66%	74%
Sand (%)	45%	37.5%	34%	26%

Moulding

The mould is used for preparing block in uniform and fixed shape. The size of mould is 76×76 mm. The mould we have used is only for the practical purpose so it was small compare to standard size. The mixture is then transfer into the block mould and is set by using tamping rod or steel rod. The surface is need to well finished by using trowel. The main faces must be coated with oil or a silver foil to easily demould after it solid. We have used silver foil in our process.



Moulding process

4. Literature review

JB Ecotex Limited

Recycles 6000 MT or 36 crores (360 Million) used water and cold drink bottles per month

Manufacturing 5000 MT high tenacity recycle polyester staple fiber (RPSF) per month

Being socially and environmentally responsible, It is a zero water discharge unit

Using wind power generated through wind mill of capacity 2.1

MW installed at Jamnagar

The sakti plastic industries

- Plastic flower pots designed out of plastic waste and manufactured maintaining the highest quality standards, pots are designed to be durable, light in weight, easily stock-able, with large drain holes and are cost-effective for the grower. Can be used for all types of indoor plants all type tabletop plants for keeping plants at office placement indoor – bedroom, living room, bathroom, office desk, dining table outdoor – can be placed outdoor in the terrace, kitchen garden.

Gjenge Makers,

Founded by Nzambi Matee, has created a lightweight and low-cost building material that is made of recycled plastic with sand to make bricks that are stronger than concrete material.

Nzambi Matee, a 29-year-old trained engineer and schooled in biochemistry, founded the new ways of converting waste into sustainable materials.

With her initiative, Matee has recently been named a Young Champion of the Earth 2020 Africa winner at the United Nations Environment Programme (UNEP). The award "provides seed funding and mentorship to promising environmentalists as they tackle the world's most pressing challenges."

Her company Gjenge Makers' project has started to use the product with paving stones applied in houses, schools or streets, the product is highly durable and diminishes its maintaining cost. Her startup company produces about 500-1000 bricks per day, "recycling close to 500 kilograms of plastic waste a day."

"Plastic waste is not just a Kenya problem, but it's a worldwide problem," said Nzambi Matee.

"Here Nairobi we generate about 500 metric tons of plastic waste every single day and only a fraction of that is recycled."

"We decided what more can we do instead of just sitting in the side-lines and complaining. Essentially, companies have to pay to dispose the waste, so we solved their problem."

"That waste essentially comes for free."

5. Summary of Results

The waste product used as the main component is plastic bags. Plastic bags is the waste product generated in very higher amount. The main sector is municipality. Products such as hand bags. Pipes, Plastic waste is available at around of us, and goes into landfills if not treated. This waste product then releases harmful

Toxic gases like methane polluting the air and it is also a source of groundwater contamination. Also, burnt blocks which utilize natural resources which leads to reduce of natural resources. To manufacture these blocks, they are burnt in alkali which creates a large amount of pollution and again harms the

Environment. Hence, this study helps in reducing the problems related to plastic waste and also helps in reducing the problems related to manufacturing of burnt blocks.

The final product from plastic waste was tested for the compressive strength and it was found that the

Compressive strength of plastic block is **5 N/mm²** which is higher than conventional bricks Which have strength between 3-4 N/mm².

6. Conclusion

Our process of making plastic block is having more advantages which includes cost effectiveness, resource efficiency, reduction in production of greenhouse gases effect, etc., plastic sand block is also known as “Eco-Bricks” made of plastic waste which is very harmful to all living things can be used for construction intention. It will increase the strength when compared to normal concert block. With the help of plastic sand block, the absorption of water is also less. Because of numerous advantages more research would improve quality and flexibility of the Plastic Block.

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