Utilization of Solid Waste Into Bricks

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Abstract- *Plastic waste which is increasing day by day becomes eyesore and in turn pollutes the environment, especially in high mountain villages where no garbage collection system exists. A large amount of plastic is being brought into the tourist trekking regions are discarded or burned which leads to the contamination of environment and air.Plastic deposition is one of the biggest problems against country. India produces large quantity of plastic in daily, Only Pune City produce 1600 tonne of waste which contains 850 tonne of plastic waste daily, which pollutes and damages the environment, have been taken to experimental study. Hence, these waste plastics are to be effectively utilised.High-density polyethylene (HDPE) & Light density polythene (LDPE) are crushed into pieces & whole plastic bricks are made; which only includes totally plastic. This possess thermal and sound insulation properties to control pollution. This is one of the best ways to avoid the accumulation of plastic waste. Also we want to us this bricks for construction of compound walls, rural houses, security cabins, etc.*

Keywords- Utilization of plastic waste into construction, Plastic waste, Plastic bricks, Construction waste.

I. INTRODUCTION

The waste plastic will be large in household time. In many countries the compositions of waste is different, that it is affected by the socioeconomic characters, waste management programs and consumption patterns, butgenerally the level of plastic in the waste composition is high.

Recycling the plastics has advantages since it is widely used and has a long service life, which means that the waste is being removed from the waste stream for a long period.The large volume of materials required for construction is potentially a major area for the reuse of waste materials.

II. MATERIALS

A. PLASTIC-

All we needed is plastic waste. So we collected all the plastic waste from the Municipal Waste Collection points. As we were making whole plastic blocks we didn't required any other material. We needed plastic waste in large amount as according to our research we needed 4-5 kg plastic waste for production of just one brick. Plastic is used in large amount for various purposes such as plastic bottles, shampoo bottles, oil cans, polyethylene bags, plastic vouchers, etc. Hence we can say that there are two types of plastic -:

1) HDPE - High-Density Polyethylene
2)LDPE - Light Density Polythene.

If they are not recycled then they will become big pollutant to the environment as they do not decompose easily & also not allow the water to percolate in the soil & they are poisonous.

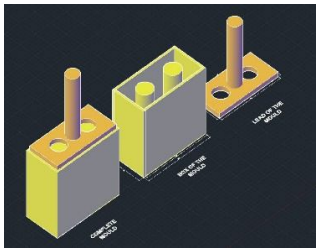
B. MOULD

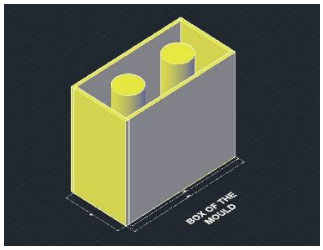
Moulds can be made up of 2 types. They are-:

1) Aluminium mould.
2) Wooden mould with Aluminium Foil covered from Inside.

Aluminium mould have high cost in manufacturing but are for lifetime while Wooden mould have low cost in manufacturing but its lifetime is not as long as Aluminium mould. So we have tried with wooden moulds & as a result they are very effective.

C. MOULD DESIGN





III. METHODOLOGY FOR PASTIC BLOCKS

1) We collected all the plastic waste, whether it is soft plastic(LDPE) i.e. plastic bags or hard plastics (HDPE) i.e. plastic bottle.
2) Then this material i.e plastic waste are crushed into the pieces by the help of mixer.
3) Then this crushed plastic waste was collected & put all together in the machine where all the crushed plastic waste is melted & then it is collected in the mould in the melted state.
4) After that all the melted plastic is spread neatly with the help of spatula & as the plastic goes down in the mould it is filled again with the melted plastic.
5) After filling the mould we kept it for 24 hours to cool down completely.
6) Then the bricks were removed from the mould.

IV. COMPARISON & TESTING OF BLOCKS

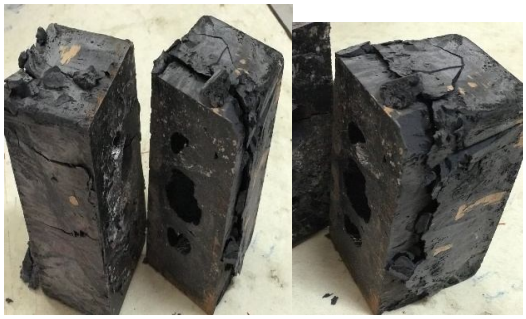
A) All this bricks were compared with other conventional bricks like Red bricks & Cement blocks.

B) Testing of Compression Strength

TYPES OF BRICKS	SAMPLE 1 (N/MM2)	SAMPLE 2 (N/MM2)	SAMPLE 3 (N/MM2)	AVERAGE (N/MM2)
PLASTIC BRICK	39.27	36.20	42.9	39.45
RED BRICK	4.77	5.48	4.68	4.98
CONCRETE BRICK	49.24	48.56	50.99	49.54

C) FIGURES-:

Fig-: Compressive Strength of Plastic Brick



D) WATER ABSORPTION TEST -:

In this the bricks first weighted in dry condition and they are immersed in water for 24 hours. After that they are taken out from water and they are wipe out with cloth. Then the difference between the dry and wet bricks percentage are calculated. So water absorption test didn't affected plastic brick. As the brick is totally made up of plastic there was no chance of water absorption.

E) EFFLORESCENCE TEST -:

The presence of alkalis in bricks is harmful and they form a grey or white layer on brick surface by absorbing moisture. To find out the presence ofalkalis in bricks this test is performed. In this test a brick is immersed in fresh water for

24 hours and then it's taken out from water and allowed to dry in shade. But again as the brick is totally made up of plastic there wasn't any mark on the brick.

F) Density of Plastic Bricks = Mass/Volume -:

1. BLOCK 1 = 1617.5/190*90*90 = 1031.01 Kg/M3
2. BLOCK 2 = 1729/190*90*90 = 1123.46 Kg/M3
3. BLOCK 3 = 1681.5/190*90*90 = 1092.5 Kg/M3

V. METHOD OF CONSTRUCTION

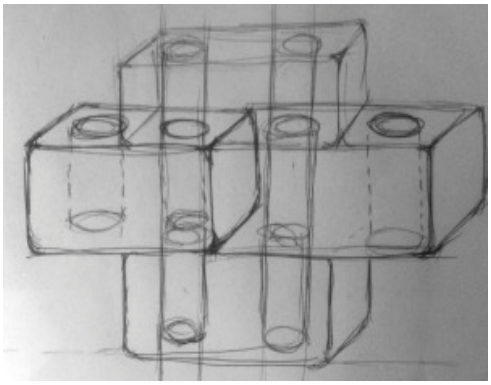


Fig-: Interlocking of the plastic bricks.

This is the method by which bricks must be interlocked & constructed in an efficient manner.

VI. CONCLUSIONS

So we can conclude that this type of plastic bricks can be produced from the waste i.e. utilization of solid waste into construction material can be done. We can recycle the waste produced in the from of plastic into this construction material & can save the nature. Also many rural houses can be protected from the monsoon as this bricks are completely unaffected from the water. Our main aim is to put waste to use & make our planet cleaner. So turning plastic waste into building solution is just one of our efforts.

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