

# Reuse of Plastic with M-Sand and Construction Demolition Waste in Manufacture of Bricks

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**Abstract**— Plastic are the one which poses important problem with disposal and still the absolute solutions were not determined. For solving this plastic were replaced with a bricks to achieve the nominal strength. Low density polyethylene (LDPE) was collected and cleaned then mixed with the M-sand and construction waste(C&D). The strength of structure and weight reaction of bricks was tested for compressive strength, water absorption test and temperature test. Reviews the reaction of plastic disposal and the result are clearly showing that some part of plastics can be definitely used in the production of bricks. Mainly focused to find the proper disposal options for plastic and also to motivate the use of plastic in the production of building materials. Finally save the environment.

**Key words:** Plastic Waste, Safe Disposal, M-Sand, Construction Demolition Waste, Compressive Strength, Save Environment

## I. INTRODUCTION

Plastic is a very useful substance in our daily life work, but after the use of plastic it is very difficult for disposal because it is a non-biodegradable substance. The properties of plastic are very unique and it can mix with every kind of material. More than a 100 million tons of plastic are produced worldwide each year. India is the fourth highest Asian importer of plastic behind Hong Kong, Philippines, Indonesia.

There are two categories of plastic shopping bags, the high density polyethylene 'singlet' bags (HDPE) and the low density polyethylene bags (LDPE). HDPE has the density range from 0.941 to 0.965 g/cm<sup>3</sup>. LDPE has the density range from 0.916 to 0.925 g/cm<sup>3</sup>. LDPE is thick and soft and can be transparent and glossy in appearance. LDPE is used in shopping bags usually with attached handles and cannot be recycled, i.e., Unlike HDPE. There are intensive uses of polyethylene bags because they are cheap, strong, lightweight, and functional for carrying food and other good. At the same time the plastic is effected the environmental. So the plastic is the enemy of the environment. Construction and demolition waste(C&D) are usually found whenever any construction or demolition activity takes place such as construction of bridges, building ,etc., these wastes can be used as landfill, base or sub base in building construction. Environmental issues such as an increase in the flood levels due to illegal dumping of construction and demolition waste(C&D) into the rivers, resource depletion, shortage of landfill and illegal dumping on hill slopes are evident in the metro cities. So the construction demolition waste(C&D) also difficult disposal.

In the present study the recycled plastic, M-sand, construction waste used to prepare the brick there by providing sustainable option to deal with plastic waste.

## II. OBJECTIVE

To develop an efficient way and to effectively utilize the waste plastics.

To reduce the consumption of natural resources such as the manufacturing of bricks.

To minimize and reuse generation of waste plastic on the land and water to avoid land and water pollution hazard.

To reduce the dumping area of waste plastics.

Targets for plastic waste reduction.

Ensure the design and manufacture of products that avoid or minimize the plastic waste generation.

Reduce the percentage (%) of recyclable material to landfill.

Easy to manage the plastic material and save the environmental wealth.

Plastic is the non-decay material. So, that is to protect from the soil.

Save the environment, save the life.

## III. MATERIALS USED

### A. Waste plastics

Plastic waste materials of LDPE were collected from the open dump sites. The plastic is melted in 130°C and using in liquid form.

### B. M-Sand

M-Sand stands of manufactured sand. M-sand is crushed aggregate produced from hard granite stone which is cubically shaped with grounded edges, washed and graded with consistency to be used as a substitute of river sand.

### C. Construction and demolition (C&D) Waste

Construction of any infrastructure make a considerable environmental impact through extraction of raw materials, the use energy in production processes and transport, production of masses of product waste and the Damage the environment and health in all phases of the life cycle of hazardous components.

## IV. MIX DESIGN

Brick size =190mmX 90mm X 90mm  
(Standard size)

Plastic (LDPE) = 50% (650 g) / 1brick

M-Sand = 40% (2 kg) / 1brick

C&D waste = 10% (300 g) / 1brick

Weight of brick= 2.755 kg



#### D. Water absorption test

Water absorption test is required to check whether the bricks are suitable for water logged areas or not. As per sanders the bricks should not absorb water more than 2%.



### V. RESULT AND DISCUSSION

#### A. Hardness test

In this test, a crack was not made on brick surfaces. So the brick is passed to the hardness test.

#### B. Soundness test

In this test two bricks were taken and they were stuck with each other. The bricks were not broken and a clear ringing sound was produced. Hence the bricks are safe to use.

#### C. Compression test

The brick of size 190mm x 90mm x 90mm. The percentage of plastic was 50% for a brick. That size of a brick is given to 12.5 N/mm<sup>2</sup> strength. The plastic brick is having elastic behaviour due to this the structure was not fully collapsed. When the plastic brick higher load in above 12.5 N/mm<sup>2</sup>.

### E. Thermal analysis

A brick, which is employed for construction should not flammable in an exposed fire. So, this test was carried out for the bricks. The brick is starting to melt at 200°C. Then the bricks go to collapse at above 200°C. It's have mostly used in wintering territories.



hardness test. That brick is starting to melt at 200°C. finally the plastic waste and construction demolition (C&D) are managed. And the environment is protected by the plastic wastes and construction demolition (C&D) waste.

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### VI. CONCLUSION

Following are the conclusion is can be made by the researches. The plastic brick manufacture in waste plastic, M-sand, construction demolition (C&D) waste. So, the plastic bricks cost is low in compared then clay Bricks. The plastic bricks gives the compression test value 12.5 N/mm<sup>2</sup> is, higher comparison then the clay bricks. That plastic bricks are producing the ringing sound. The brick is passed to the