Paving Block Design Using Waste Materials And By Products

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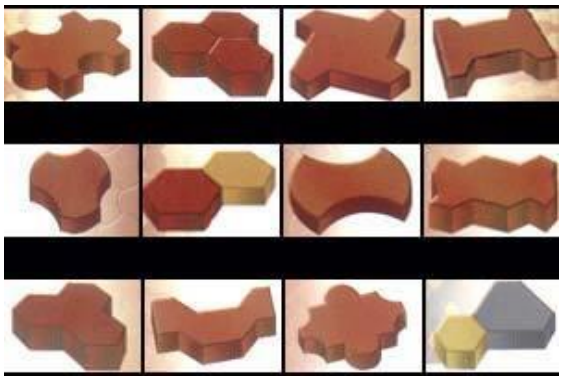
Abstract- *In waste, plastic and glass waste is increasing day by day, there were different steps taken to reduce its consumption this waste pollutes the environment and make it unhealthy. The use of plastic and glass in paver block construction gives it more advantage and also contribute in reduction of waste in environment. The compressive strength of waste paver block as compared to standard block will be more and different.*

I. INTRODUCTION

Paving blocks are industrial product of pre fabricated concrete. Paving blocks are an outdoor floor or surface covering. The appeal of paving blocks is that they are able to provide a hard surface which is visually attractive and easy to walk upon while at the same time easy for maintenance.



Paver Block
(Fig. no. 1)

Paving blocks can be used for a range of applications such as gardens, foot path, car parking, bus terminals, petrol station, industrial estates and many other uses. paving blocks are versatile, aesthetically attractive, functional, cost effective and requires less or no maintainance if correctly manufactured and laid.

As per the central pollution control board (CPCB) in India every year 3.3 million metric tonnes of plastic waste is generated. This waste is discarded without any treatment which results in thousands of marine mammals die every year eating plastic bag for mistaken food. Same as marine mammals on land many animals suffer from similar fate. Plastic have different types of properties like it is durable, light weight, good insulation from cold and heat and it enhances the strength when mixed with the concrete and it is economical.

Glass waste is another waste material that is produced in large quantities and is difficult to eliminate. It is obtained from building demolition, tube light, bulbs etc. Glass waste is non biodegradable material which does not decompose quickly. It can stay intact in environment for hundreds of year. In India 3 million tonnes of glass waste is produced every year which have negative impact on environment and marine life.

Fly ash is factory product made by burning of coal in associate degree static electrical device, a by-product of industrial coal. The cementitious properties of ash were discovered in late 19th century and it's been widely used in cement manufacture for over a hundred years. In India fly ash production is on major scale. The central government is coming up with a concrete plan to utilise fly ash with the further opening up of new mines.

II. OBJECTIVES

- To study the waste material which is not recycled in the environment.
- To use a mixture of different non hazardous waste materials to make paving blocks and to reduced percentage of cement in mixture.
- To reduce CO2 emission by reducing cement production.
- To minimize the cost of paver blocks.

III. METHODOLOGY

A. Materials :-

- Cement : Ordinary Portland Cement (OPC) (53 grade)
- Aggregate: Fine aggregate (stone crushed dust)

- Coarse aggregate (10 mm)
- Water
- Waste: plastic waste
- Glass waste
- By product: Fly ash

B. Weighing:

The proportions or the materials are taken by weight method or volume method weight method is more accurate than volumetric method. So we will prefer weight method.

C. Mixing :

After taking weights of all materials the next procedure is mixing. The mixing will be done manually. To get good results the mixing can also be done by small mechanical mixers.

D. Casting of cubes :

After mixing process casting of cube is carried out. Each of 2 blocks for 7 days, 14 days, 28 days are casted.

E. Compaction :

The compaction will be carried out manually with tamping steel rod. The concrete will be filled in 3 layers. Each layer will be tamped for 25 times compaction is carried out to remove voids and denser the concrete. After compaction of the last layer finish the top surface by trowel.

F. Curing :

The blocks are demolished and kept for 24 hours in a shelter away from direct sun and wind due to curing process the blocks are protected from loss of moisture and get required strength.

G. Testing :

Compressive strength test.

IV. MATERIAL

A. Cement :

- Ordinary Portland Cement (OPC) (53 Grade).

B. Aggregate:

- Fine Aggregate (Stone crushed dust): Stone crushed dust is obtained from crusher plants. It can be used as replacement of natural river sand.
- Coarse Aggregate: 10 mm size.

C. Water:

Water used for mixing and curing for blocks should be free from harmful material and strain on surface.

D. Waste:

a) Plastic waste

Plastic Waste
(Fig. No. 2)

b) Glass waste

Glass Waste
(Fig. No. 3)

E. By product:

a) Fly ash

Fly Ash
(Fig. no. 4)

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