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An Experimental Investigation Use of Waste Plastic and Waste Glass Together as Coarse Aggregate in Paver Block

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ABSTRACT
Waste has become a major problem these days. Glass and plastic are found in municipal solid waste (MSW), and are of the most used daily materials. The amount of glass and plastics consumed annually has been growing steadily. Its low density, strength, user- friendly design, fabrication capabilities, long life, lightweight, and low cost are the factors behind such phenomenal growth. As waste plastic and waste glass is non-biodegradable material it blocks drains, pollutes rivers and streams have on the environment. This project focus on partially replacement of waste plastic and waste glass together as coarse aggregate in concrete paver block. To evaluate the effects of including these wastes, mechanical test like compressive strength test is conducted. The aim of the project is to recycle the waste plastic and waste glass into a paver block and to reduce the cost of paver block. This can serve as environmental friendly.

Keywords: Compressive Strength, Environmental Friendly, Glass, Paver Block, Plastic Waste.

INTRODUCTION

Concrete is the one of the common material for producing different construction related structures around the world, mainly due to low cost, availability, long period of durability, and ability to withstand very bad weather conditions. Glass and plastics have become an inspirable and interval part of our lives. It results in a matter that even through the concrete produced with such waste can be used for structural appliances. A good quality paver block for cheap raw material can be achieved it will be the effective method to reduce waste. It expected that paver block will be lighter than conventional paver block. Use of waste plastic and waste glass in composition will show moderate increase in Compressive strength as compared to conventional paver blocks. The use of waste glass use as coarse aggregate decrease the unit weight of concrete.

LITERATURE REVIEW

From the experimental results **Pooja Bhatia produces** LDPE-bonded sand blocks and pavers. The density and compressive strength were found to be increased as the particle size of the sand were decreased. **Aarti Ghude** Plastic is of many different types such as High-Density Poly-ethylene (HDPE), This project aims to replace the bonding given by cement in paver blocks with the melted plastic waste. In this project, we

have used plastic waste in different ratios with fine and coarse aggregate. The paver blocks were prepared and tested. The water absorption capacity of the plastic paver block is less. S. **Arjun Kumar,S. Ganesh Babu** investigated addition of waste plastic waste lime sludge from the paper industry a as replacement of fine aggregate in paver blocks. In project, we have to use lime sludge, waste plastic in different proportion with sand. we can use the plastic in paver block.**Avinash G B, Roja A P, Santosh M The** heated of waste plastic and then added sand in it which is manually carried out as well as mechanically. In this present work, the Plastic paver is made by adding 40%, 50%, 60%, and 70% of plastic waste by weight of sand required to fill the mold of pavers. In that four-trial work, it is found that a minimum of 60% waste additive is required to get the desired shape of the mold and 70% waste additive.

MATERIAL

The detail of various materials used in the experimental investigation will be:

- Coarse Aggregate-Crushed granite stone aggregate of maximum size 20 mm
- Sand (Fine Aggregate)- The fine aggregate used was sand passing through 4.75 mm sieve. The grading zone of fine aggregate was zone I as per IS specification.
- Cement -Pozzolana Portland Cement (43Grade)
- Water - Ordinary clean potable water free from suspended particles and chemicals was used for mixing and curing concrete.
- Plastic – Hand cutting and shredded the plastic waste.
- Glass - Shredding of glass waste.

METHODOLOGY

Experimental Procedure: To investigate the use of waste plastic and waste glass together as coarse aggregate in paver block. concrete moulds were casted using 10%, 15% and 20% waste plastic and waste glass and were cured for 7and 28 days and were tested for characteristic strength. The mould was filled in three layers tamping each layer 25 times. The compressive strength is taken as maximum compressive load resisted by per unit area.

- Size of mould: 195 mm x 95 mm x 60 mm
- Characteristic compressive strength of 20 N/mm^2
- Curing period of 7 and 28 days, cubes were tested, and the average compressive strength recorded.

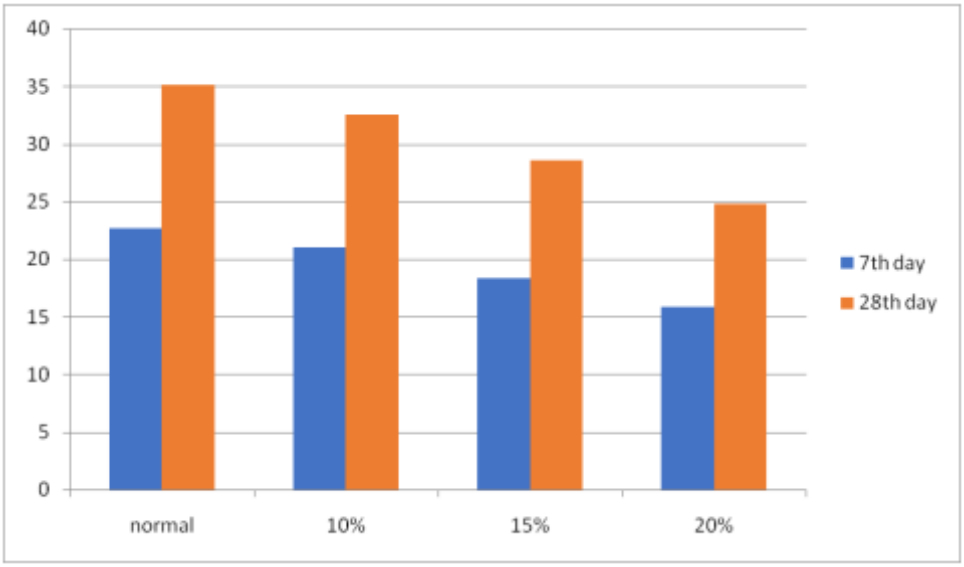
TEST RESULTS FOR M20 GRADE CONCRETE

The concrete cubes were tested in Compression Testing Machine. The tests were carried out at Shri Siddheshwar Women's Polytechnic, Solapur for M20 grade of concrete.

Compressive Strength of Concrete in N/mm^2

	Normal Concrete	10 %waste materials	15% waste materials	20% waste materials
7th Day Test	22.672	21.053	18.354	15.834
28th Day Test	35.088	32.569	28.610	24.831

Fig. Showing Compressive Strength of Paver Block in N/mm^2



CONCLUSION

1. As the percentage of waste plastic and waste glass increases, there is a decrease in weight of paver blocks.
2. As the percentage of waste plastic and waste glass increases, there is a decrease in % water absorption of paver blocks.
3. As the percentage of waste plastic and waste glass increases, there is a decrease in the compressive strength of paver blocks.
4. Paver block with partial replacement of coarse aggregate upto 15% Waste Plastic and 15% Waste Glass can be used instead of conventional paver blocks available in market.

Paver block with partial replacement of coarse aggregate by 20% Waste Plastic and 20% Waste Glass show very less compressive strength i.e. below the desired level. Thus, this replacement is not recommended.

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