Manufacturing and Testing of Paver Block using Molten Waste Plastic

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Abstract- *The aim of this project is to replace cement with plastic waste in paver block and to reduce the cost of paver block when compared to that of convention concrete paver blocks. At present nearly 56 lacs tones of plastic waste is produced in India per year. The degradation rate of plastic waste is also a very slow process and a very serious problem.*

Using this waste plastic and fly ash will reduce the cost of the paver block. Hence the project is helpful in reducing plastic waste in a useful way. In this project we have used molten plastic waste in different proportions with quarry sand, fly ash. The paver blocks were prepared and tested and the results were discussed

I. INTRODUCTION

Paver block paving is versatile, aesthetically attractive, functional, and cost effective and requires little or no maintenance if correctly manufactured and laid. Most concrete block paving constructed in India also has performed satisfactorily but two main areas of concern are occasional failure due to excessive surface wear, and variability in the strength of block. Natural resources are depleting worldwide at the same time the generated wastes from the industry and residential area are increasing substantially. The sustainable development for construction involves the use of Nonconventional and innovative materials, and recycling of waste materials in order to compensate the lack of natural resources and to find alternative ways conserving the environment. India is a developing country. Urbanization in in India growing rapidly. Due to increase in cities use of plastic becomes more efficient. Plastic waste cannot be destroyed up to 300 year, it is very dangerous to human life as well as to other environmental factors. Burnt plastic produces poisonous gases, smell and hazardous material

1.1 NECESSITY

Plastic waste used in this work was brought from the surrounding areas. Currently about 56 lakh tones of plastic waste dumped in India in a year. The dumped waste pollutes the surrounding environment. As the result it affects both human beings and animals in direct and indirect ways.

Hence it necessary to dispose the plastic waste properly as per the regulations provided by our government. The replacement of plastic waste for cement provides potential environmental as well as economic benefits. Using this plastic waste we can manufacture tiles and paver blocks.

1.2 Objectives

- To study the effect of replacement of cement with molten plastic waste and fly ash as binding materials in manufacturing of Paver blacks.
- To compare Compressive strength of normal concrete paver blocks and Paver block manufactured using Plastic waste
- To study the Heat Resistance properties of Paver block manufactured from plastic waste.
- To reduce the plastic waste from environment and use this non degradable material in manufacturing of building material.

II. SCOPE OF PROJECT

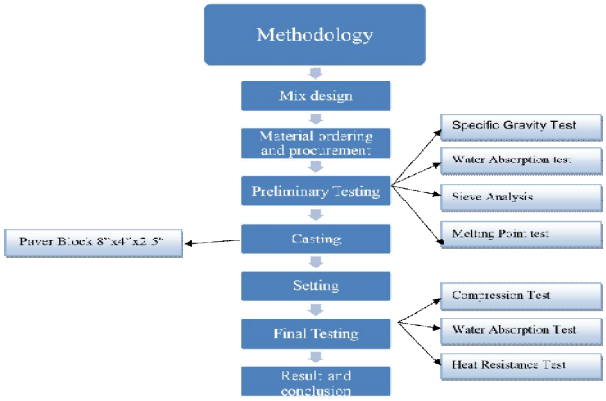
- Plastic paver blocks replace ordinary blocks with comparatively low price.
- Good strength can be achieved.
- Using waste plastic can reduce the percentage of plastic in environment.
- Replacing cement with plastic waste lowers the manufacturing cost of Paver blocks.

III. INTRODUCTION OF NEW SPECIMEN

Quarry sand, Waste plastic (LDPE), Fly Ash were used for preparation of the specimens for various tests. Waste plastic was melted using fire and quarry sand with fly ash according to mix proportion were mixed with molten plastic.

Mould made up of mild steel was used to cast Paver blocks for testing with different mix proportion. Tests such as, compressive strength, water absorption, heat resistance were done on hardened Paver blocks. The present experimental research work requires preliminary investigations in a methodological manner.

IV. METHODOLOGY



4.1 PROPERTIES OF MATERIAL USED

4.1.1 QUERRY SAND

Sr.	Properties	Values
1.	Size	<4.75mm
2.	Specific Gravity	2.61
3.	Water Absorption	1.76%

4.1.2 FLY ASH

Sr. no.	Description	Values
1.	Moisture contain	0.080%
2.	Compressive strength with compare of OPC	91.90%
3.	Initial setting time	150-170 min

4.1.3 LDPE (WASTE PLASTIC)

Sr. no.	Description	Results
1.	Specific Gravity	1.4
2.	Water Absorption	0.5%
3.	Density	0.91- 0.97m^3
4.	Melting Point	140^0

V. MIX PROPORTIONS

Mix proportion 1

Sr. no.	Material	Proportion by Weight
1.	Quarry Sand	2 kg
2.	Waste Plastic	1 kg
3.	Fly Ash	0.25 kg

Mix proportion 2

Sr. no.	Material	Proportion by Weight
1.	Quarry Sand	2 kg
2.	Waste Plastic	1.5 kg
3.	Fly Ash	0.25 kg

VI. TESTS CARRIED OUT ON SPECIMEN

6.1 COMPRESSIVE STRENGTH TEST

Sr. no	Specimen no.	Compressive load (KN)	Compressive strength (Mpa)	AVG
			24 hours	
1.	S1	380	19	19.5
	S2	400	20	
2.	S3	320	16	15.75
	S4	310	15.5	

Fig.1 Compression test

6.2 WATER ABSORPTION

Sr. no.	Specimen no.	Wet Weight(kg) (*Ww*)	Dry Weight(kg) (*Wd*)	% of water absorption
1.	1	3.05	2.92	3
	2	2.98	2.90	3.2
2.	1	2.83	2.72	4.1
	2	2.89	2.78	4. 3

6.3 HEAT RESISTANCE

Sr.no.	Mix Proportion	Specimen no.	Temperature ^{o}C	Remark
1.	2:1:0.25 (quarry sand+waste plastic+fly ash)	1	124	Melts
2.		2	113	Melts
3.		1	95	Melts
4.		2	92	Melts

VII. CONCLUSION

- The utilization of waste plastic in production of paver block has productive way of disposal of plastic waste.
- The cost of paver block is reduced when compared to that of concrete paver block.
- It also shows good heat resistance.
- Though the compressive strength is low when compared to the concrete paver block it can be used in gardens, pedestrian path and cycle way etc.
- Paver block made using plastic waste, quarry dust, coarse aggregate and ceramic waste have shown better result.
- It can be used in Non-traffic and light traffic road.

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