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STUDY THE CHARACTERISTICS OF CONCRETE PREPARED USING MULTILAYER PLASTIC

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***Abstract*—The problem of plastic as waste has been biggest challenge in front of whole human race as it is non- biodegradable.** **Plastic being one of the biggest innovation of the 20th century as human life is dependable on plastic as we cannot imagine life without plastic. We started utilizing plastic in such a quantity that now its decomposition is the biggest problem and to solve this rather than finding methods of decomposition we started finding the ways in which we reuse plastic and try to eliminate its effect. There have in many innovative ways we discover for reutilization of plastic with an aim of decrease its carbon foot print over the planet earth. One of such way was including it in the construction work as well as Highway pavement design. The production of concrete as well as its cost of production has increased over the decade.**

An attempt has been made in order to meet the above demand, utilization of plastic waste multi layer has been done in production of concrete of grade M30 was carried out.

***Index Terms*— concrete grade M30, multilayered use plastic, compression test value, slump test value**

I. INTRODUCTION

Unlike other forms of wastes like paper, food peels, leaves etc, which are biodegradable (capable of being decomposed by bacteria or other living organisms) in nature, plastic waste because of its **non-biodegradable nature** persists into the environment, for hundreds (or even thousands) of years. Plastic pollution is caused by the **accumulation of plastic waste** in the environment. It can be categorized in **primary plastics**, such as cigarette butts and bottle caps, or **secondary plastics**, resulting from the degradation of the primary ones. A recent study conducted by **Un-Plastic Collective** has revealed that India generates **9.46 million tonnes** of plastic waste annually, of which **40% remains uncollected** and **43%** is used for packaging, most of which are of **single-use plastic**.

They have resulted in blockage of the drainage system of a city which serves as excellent breeding grounds for disease-causing mosquitoes and water borne diseases besides causing flooding. Plastic garbage generated can reduce the rate of rain water infiltration and deteriorate the soil fertility if it is mixed with soil. Plastic waste released into rivers, streams and seas contaminates the water and marine life. We have seen the result as Aquatic animal consume plastic waste, which can damage their health as well the health of the human which consume them. Some aquatic animals have been found with plastic fragments in the stomachs and plastic molecules in their muscles. Dumping of the plastic either single layer or double layer is one of the biggest problem the world at present is facing. Being cheaper plastic have replaced many other materials such tin box etc in the house hold item. Package industries are mostly relaying on plastic material and on unpacking the item it serve as the biggest waste produce.

The research aimed at utilization of plastic in any form in the construction industry and to contribute in the biggest problem of plastic waste i.e. dumping by using it as a replacement of fine aggregate in the manufacturing of concrete of grade M30.

II. MATERIAL AND METHODS

The various type of material used in casting process of concrete are: fine aggregate, course aggregate, cement, water and multi layered plastics i.e. The multilayered plastic waste is generally colored packing material which is a combination of plastic and aluminum it include chips, biscuits, chocolate and toffee wrappers and other packed material. Waste Plastic was shredded into fibers of size length 1mm to 8mm and width 0.15mm to 5mm in this study.

Firstly, we have to cast conventional concrete i.e. CM_1, after it samples for MLP_1, MLP_2, MLP_3, MLP_4, MLP_5, MLP_6, MLP_7 as per their proportioning were casted and tested at the curing period of 7, 14 and 28 days for all the strength test as shown in table 1:

Table 1: Proportion of Material Used

MIX	**Waste plastic(%)**	**Weight plastic (Kg)**	**Cement (Kg)**	**water**	**Admixture (Kg)**	**Coarse Aggregate (Kg)**		**Fine Aggregate Kg**
						20mm	**10mm**	
CM_1	0	0	390	148	5.46	565	691	675
MLP_1	0.1	3.9	390	148	5.46	565	691	675
MLP_2	0.2	7.8	390	148	5.46	565	691	675
MLP_3	0.3	11.7	390	148	5.46	565	691	675
MLP_4	0.4	15.6	390	148	5.46	565	691	675
MLP_5	0.5	19.5	390	148	5.46	565	691	675
MLP_6	0.75	29.25	390	148	5.46	565	691	675
MLP_7	1.0	39	390	148	5.46	565	691	675

III. RESULT AND DISCUSSION

1. SLUMP TEST: The slump test was carried out and following observation was carried with varying the %age of single layer waster plastic:

Table 2: Slump Test value

MIX	CM_1	MLP_1	MLP_2	MLP_3	MLP_4	MLP_5	MLP_6	MLP_7
Waste plastic(%)	0	0.10	0.20	0.30	0.40	0.50	0.75	1.0
Slump Value (mm)	50	40	38	35	35	32	30	27

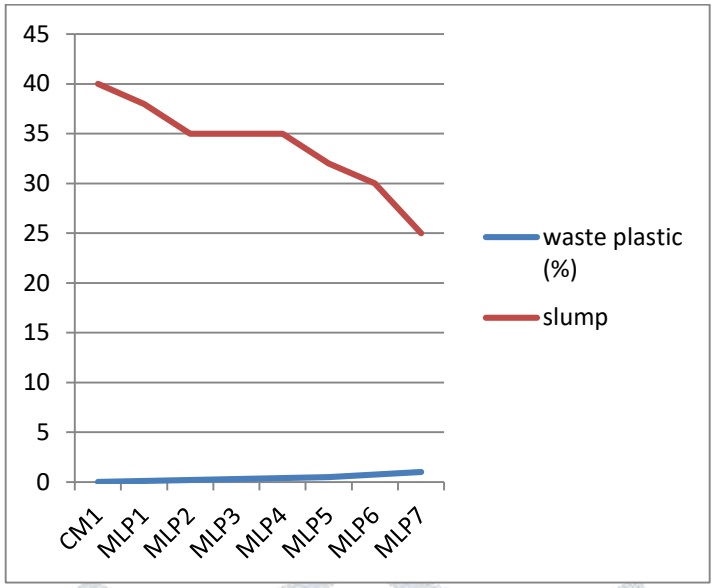

Figure 1: Relation of Slump value with varying Plastic waste

2. COMPRESSIVE STRENGTH TEST:

The compressive strength on various sample prepared were crushed under CTM at different crushing ages are shown in table:

Table 3: Compressive Test Result

MIX	**Waste plastic(%)**	**Compressive Strength N/mm^2(Days)**		
		7	**14**	**28**
CM_1	0	32.41	37.00	43.915
SLP_1	0.1	32.900	37.100	44.61
SLP_2	0.2	33.10	37.90	45.30
SLP_3	0.3	29.32	33.42	40.100
SLP_4	0.4	28.86	33.515	39.85
SLP_5	0.5	28.77	33.10	39.40
SLP_6	0.75	26.40	30.40	36.59
SLP_7	1.0	32.41	37.00	43.915

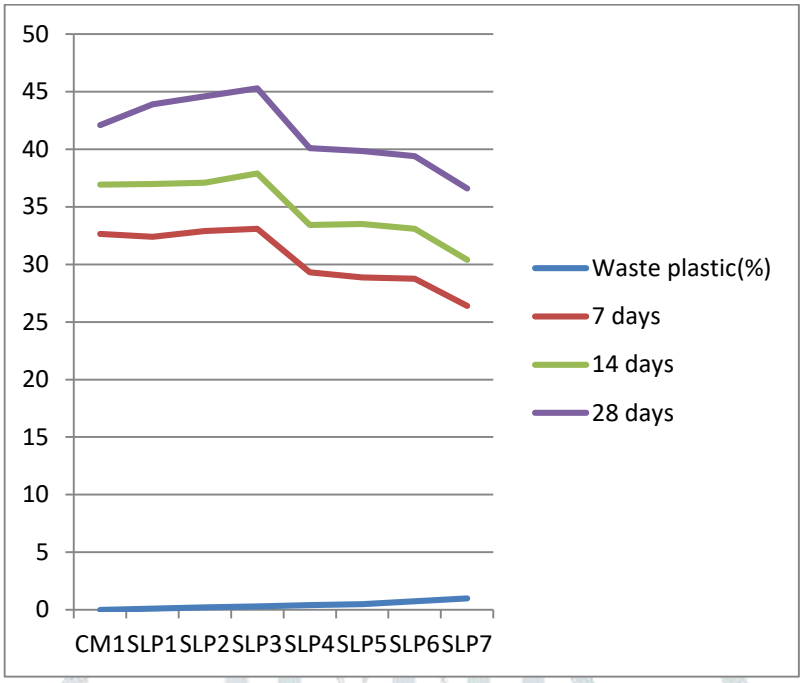

Figure 1: Relation of Compression Test after 7, 14, 28 days with varying Plastic waste

IV. CONCLUSION

1. From the test results it shows that with addition of MLP waste there is increase in the compressive strength upto 0.3% and starts decreasing after that, and with 1% MLP waste the decrease in compressive strength is 13.1%.
2. Decrease in strength due to decrease in adhesive strength between the surface of waste plastic with cement paste as well as the particle size of the waste plastic in it.

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