An Experimental Study on Fine Aggregate By Partial Replacement of Solid Plastic Waste

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Abstract: Concrete is a material which generally utilized in development enterprises. The age of Plastic wastage is expanding step by step, making difficult issue nature. The main research of this solid plastic waste particle is used in the concrete by partial replacement of fine aggregate in concrete. The fundamental reason for this examination to explore the properties of cement, for example, compressive, tensile just as flexural quality in the fractional substitution. The outcomes show that the utilization of strong plastic waste particles in the solid outcome the arrangements of light weight concrete. The removal issue can be overwhelmed by recuperation, reusing and reuse. So as to have profound information about the strong plastic waste. Plastic solid and debase gradually. In this task fractional substitution of fine total by strong plastic misuse of about 0%, 10%, 20%, 30% and 40% for blend plan of M40.The quality properties for this solid blend at 7 days and 28 days have been tried.

Keywords —cement, fine aggregate, course aggregate, Compressive strength, Split tensile strength, flexural strength

I. INTRODUCTION

Condition implies environmental factors which incorporates air, lithosphere and biosphere. Biosphere includes living and non-living beings. The biosphere is influenced by various kind of contamination. Mostly contamination is because of arrival of polluted water into the water bodies, discharge of effluents into the air and removal of strong waste. The total plastic produced worldwide in 2014 was estimated at 313 million tones in 2015 it increases to 322mt, which is about 3%rise in 2 year .India consumptions of plastic will grow 15 million tons by 2019 and is set to be third largest consumer of plastic in the world.

A plastic materials is an organic solid, essentially a polymer or combination of polymer of high molecular mass .A polymers is a chain of several thousands of repeating molecular units of monomers. The monomers of plastic are either natural or synthesis organic compounds. Plastic in various structures is discovered to be nearly 5% in civil strong waste, which s harmful in nature. it is regular sight in both metropolitan and rustic regions to discover void plastic sacks and different sorts of plastic pressing materials littering the street just as channels. Duty to non-biodegradable it makes stagnation of water and related cleanliness issue.

II. AIM OF THE PROJECT

The Main aim of the project is study the strength properties of compressive strength, spilt tensile strength and flexural strength of concrete mix of M40 grade on partial replacement of solid plastic waste by 0% 10%, 20%, 30%, &40%.

III.PROPERTIES OF MATERIALS USED

1. Cement

Ordinary Portland cement of 53 grade conforming to both the requirements of IS: 12269 and ASTM C 642-82 type-I was used.

Table 1

S.No	Property	Result
1	Normal Consistency	32%
2	Initial setting time	≮45min
3	Final setting time	≯360min
4	Specific gravity	3.1

2. Plastic Powder

Specific gravity of plastic powder=0.92

3. Fine Aggregate

Table 2

S.No	Property	Result
1	Specific gravity	2.61
2	Water Absorption	0.4

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4. Coarse Aggregate

Table 3

S.No	Property	Result
1	Specific gravity	2.60
2	Water Absorption	1

IV. CONCRETE MIX PROPORTION

The grade of concrete is used for M40

Water-cement ratio is 0.4

Mix proportion of concrete is

Cement: F.A: C.A = 1: 1.69: 2.99

Concrete mix M1, M2, M3, M4, M5 is prepared by 0%, 10%, 20%, 30%& 40% partial replacement of plastic powder.

V. RESULTS AND DISCUSSIONS

The study is carried out to find out the compressive strength, split tensile strength and flexural strength.

1. Compressive strength

Figure 1

Compressive Strength of cube specimens at 7 days & 28 days when cement is partially replaced with plastic powder in normal curing:

Table 4

S.NO	M1	M2	M3	M4	M5
7 Days Compressive Strength N/mm²	31.48	33.46	35.22	34.59	32.23
28 Days Compressive Strength N/mm²	47.30	48.23	50.12	49.25	48.56

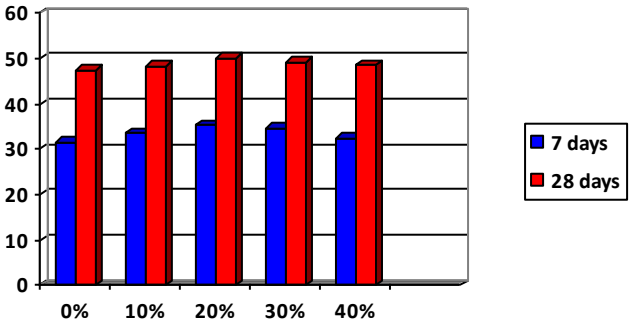

Figure 2

From the above compressive strength results we can conclude that the Optimum strength is obtained at 20% replacement of plastic powder.

2. Split Tensile strength

Figure 3

Split Tensile Strength of cube specimens at 7 days & 28 days when cement partially replaced with plastic powder in normal curing.

S.NO	M1	M2	M3	M4	M5
7 Days Split Tensile Strength N/mm²	2.2	2.5	3.6	3.01	2.56
28 Days Split Tensile Strength N/mm²	3.5	3.70	5.00	3.5	3.02

Table 5

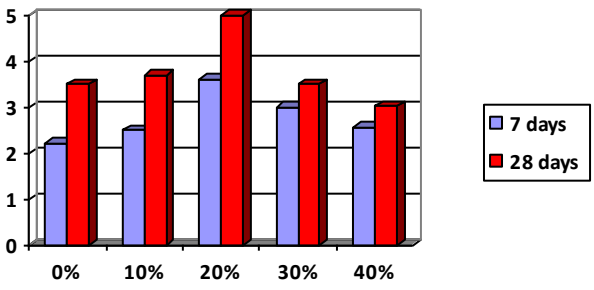

Figure 4

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From the above Split Tensile strength results we can conclude that the Optimum strength is obtained at 20% partial replacement of plastic powder.

3. Flexural strength

Figure 5

Flexural strength of cube specimens at 28 days

Table 6

s.no	M1	M2	M3	M4	M5
flexural strength2 8 days (N/mm2)	3.12	4.18	5.12	4.39	3.29

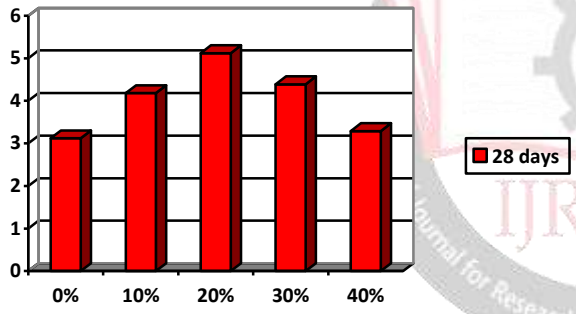

Figure 6

From the above flexural strength result we can conclude that optimum strength is obtained at 20% partial replacement of plastic powder.

VI. CONCLUSION

1. From the above experimental study, the specimens' concrete cubes were casted and tested for its Compressive strength.
2. The compressive strength, increment with expansion of waste plastic powder content at 20%, the Obtained value is 48.23 at 28 days curing when compared with conventional concrete.
3. The split tensile strength increment with expansion of waste plastic powder content at 20%, the Obtained value is 5.00 at 28 days curing when compared with conventional concrete.
4. The flexural strength increment with expansions of waste plastic powder content at 20%, the obtained value is 5.12 at 28 days curing when compared with conventional concrete.
5. The functionality of cement has been found to diminish with increment in plastic powder content.
6. It is reasoned that the increments of strong plastic waste in our customary solid work will influence to a great extent on quality and conduct of the solid.
7. Moreover, the expansion of the strong plastic waste may improve a portion of the properties of the solid.

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