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Properties of concrete with pen waste

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ABSTRACT

Plastic is the one of the waste material which is increasing day by day whereas the concrete is the construction material which is also using more day by day. As the plastic is harmful material for the environment so to decrease the plastic material we are using the one of the most important materials waste i.e pen waste in the place of fine aggregate. The replacement of waste with fine aggregates by different proportions for M20 grade of concrete is done (2%,4%,6%,8% &10%) and strength was increased with 4 % of waste.

Keywords: *Cement 1, Course and fine aggregates 2, plastic waste 3, Compressive Strength.*

1. INTRODUCTION

For Past many years construction industry has been making some progress in the utilization of waste materials in concrete. The waste materials which cannot be harmful to environment. Plastic is the one of the waste material which is increasing day by day and which will be more effected for environment that can also replace with aggregates. The plastic waste is replaced by different proportions and the strengths are calculated.

2. MATERIALS USED 2

2.1 Cement 1

In this experiment 43 grade ordinary Portland cement is used. The testing of cement is done as per IS …. Code the specific gravity of cement found is 3.10.

Content, %	Common Name	Oxide
60-67	Lime	CaO
17-25	Silica	SiO2
3-8	Alumina	Al2O3
0.5-6	Iron	Fe2O3
0.1-4	Magnesia	MgO
0.2-1.3	Alkalies	Na2O and K2O
1-3	Sulfuric anhydride	SO3

Chemical Properties of cement

2.2 Course aggregates

Coarse Aggregate used was with maximum size aggregate of 20 mm obtained from local market. The physical properties of coarse aggregate like specific gravity and fineness modulus were found to be 2.63 and 7.30 respectively. The specific gravity is calculated from code IS The details of sieve analysis are given in Table

Sl. No.	Sieve Size	Weight retained in gm	% weight retained	Cumulative % weight Retained	% of passing in each sieve
1	80 mm	0	0	0	100
2	40 mm	0	0	0	100
3	20 mm	1598	31.96	31.96	84.20
4	10 mm	3310	66.20	98.16	64.20
5	4.75 mm	92	1.84	100.00	6.00
6	2.36 mm	0	0	100.00	0.40
7	1.18 mm	0	0	100.00	0.00
8	0.60 mm	0	0	100.00	0.00
9	0.30 mm	0	0	100.00	0.00
10	0.15 mm	0	0	100.00	0.00

Fineness of coarse aggregates

Sl. No.	Property	Value
1.	Specific gravity of Fine Aggregate	2.89
2.	Fineness Modules	7.30

2.3 Properties of fine aggregates

Fine Aggregate used was natural sand obtained from local market. The Physical properties of fine aggregate like specific gravity and fineness modulus were found to be 2.65 and 2.47 respectively. The details of specific gravity results are in Table

Sl. No.	Sieve Size	Weight retained in gm	% weight Retained	Cumulative % weight retained	% of Passing in each sieve
1	4.75 mm	4	4/1000x100= 0.40	0.40	99.60
2	2.36 mm	10	1.00	1.40	98.60
3	1.18 mm	144	14.40	15.80	84.20
4	600 micron	200	20.00	35.80	64.20
5	300 micron	582	58.20	94.00	6.00
6	150 micron	56	5.60	99.60	0.40
7	Tray	4	0.40	100.00	0.00

Fineness of coarse aggregates

Sl. No.	Property	Value
3.	Specific gravity of Fine Aggregate	2.65
4.	Fineness Modules	2.47

2.4 Properties of pen waste

The waste which was taken by pens shown in the above figure, the pens where crushed by crushing machine in to fine aggregate size and the below table says about the chemical properties of pen waste.

Chemical	Percentage
Sio2	63.29
A12o3	18.29
Fe2o3	4.32
Cao	4.46
Mgo	0.72
P2o5	0.16
K2o	2.18

2.5 Water

The least expensive but the most important ingredient of concrete is water. The water which is used for mixing concrete should be clean and free from harmful impurities such as oil, alkali, acid etc. portable water was used for mixing and curing work.

3. RESULTS 4

Strength properties of concrete with pen waste

S.no	Combinations	Strength
1	Conventional concrete (CC)	21.03
2	CC+2% Pen waste	20.56
3	CC+4% Pen waste	22.25
4	CC+6% Pen waste	20.15
5	CC+8% Pen waste	19.56
6	CC+10% Pen waste	20.10

4. CONCLUSIONS 5

A. Based on the present experimental investigation the following conclusion are drawn

• The specific gravity of cement is same as per code
• The properties of aggregates as per code.
• The strength of the concrete is done for conventional concrete.
• The strength properties of concrete with pen waste is done for different proportions.
• The strength was normal when 2% of pen waste is added to concrete with replacement of fine aggregates.
• The strength was increased when 4% of pen waste is added to concrete with replacement of fine aggregates.
• The strength was normal when 6%, 8%, and 10%, of pen waste is added to concrete with replacement of fine aggregates.
• Finally we can use the pen was in concrete at 4% to decrease the waste and to concrete the environment effect.

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BIOGRAPHY

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