Partial Replacement of Coarse Aggregate by using Recycled Aggregate

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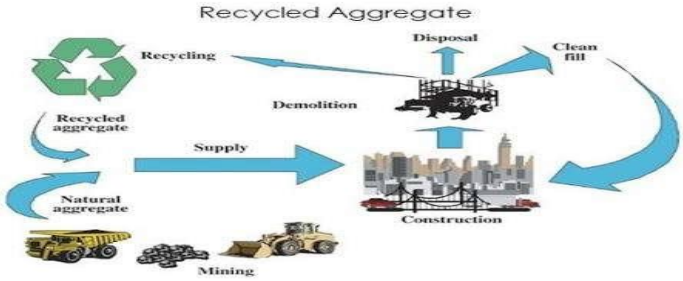
Abstract: ***The high and rapidly rising cost of cement has made construction expensive in developing countries where cement is commonly used. Tests were conducted in this undertaking research with the selection of necessary materials and information required for the configuration of the blend is collected. Cubes and cylinders were casted with these concrete mixtures and subjected to 7-day, 14-day and 28-day healing and determining their strength. The determined compressive strength and spilt tensile strength was compared with the conventional concrete for percentage replacements of (0%,5%,10%,15%).***

Keywords: ***compressive strength, extravagant, blend configuration***

I. INTRODUCTION

A. General

Preservation of asset is consistently the need of mankind. In the beginning of time/development, we have utilized the assets yet not long after we have begun once again misuse. This outcomes in the shortage of assets. Later on we have known the way that we have to moderate the assets. In this manner human have concluded that we need to utilize assets productively. Reused total can be utilized for some reasons. They can be utilized in buildings and dams[1]-[6]



II. OBJECTIVES

1. To study the workability of concrete .
2. To study the compressive and split tensile (strength) with various Percentage replacement of recycled coarse aggregate (5%, 10% & 15%)
3. To reduce the impact of waste material on construction.

III. MATERIAL TESTING

A. FINE AGGREGATE:

TEST FOR SPECIFIC GRAVITY:

Fine Aggregate total utilized in this investigation is locally accessible and affirmed to reviewing zone II according to IS383-1970, the total whose size is under 4.75mm. Sand is commonly considered to have a lower size utmost of about 0.07mm.

Table: Physical Parameters of Fine aggregate

Si. No	Parameters	Results
1	Specific Gravity	2.19

COARSE AGGREGATE:

Coarse total will comprise of squashed or broken stones and be hard, solid, tense, sturdy, spotless and legitimate degree. The properties of coarse aggregate studied where impact value, Los Angel's abrasion test and specific gravity test.

CEMENT:

Concrete sets or fixes when blended with water which causes a progression of hydration substance responses.

The properties of cement initial setting time and specific gravity is studied.[6]-[13]

Table: Physical Parameters of cement

Si. No	Parameters	Results
1	Specific Gravity	3.15
2	Initial setting time	42 minutes
3	Fineness	95%

Water is to be utilized in the solid work ought to have the accompanying properties: It ought to be free from antagonistic measure of soil, soluble bases or other natural or inorganic impurities.It ought to be free from iron, vegetable issue or some other sort of substances, which are probably going to have unfriendly impact on cement or support.

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RECYCLED COARSE AGGREGATE:

Reused Aggregate comprises of hard, graduated parts of dormant mineral materials.

Table: Physical Parameters of Recycled Coarse aggregate

Si. No	Parameters	Results
1	Specific Gravity	2.74

Table: Physical Parameters of coarse aggregate

Si. No	Parameters	Results
1	Specific Gravity	2.73
2	Impact Factor	19.51%
3	Water Absorption	4%

TEST FOR CONCRETE

SLUMP TEST:

Slump test is the most consistently used method for assessing consistency of strong which can be used either in research focus or at site of work

Si. No	% Replacement	Slump value (mm)
1	0 %	70
2	5 %	90
3	10 %	110
4	15 %	140

COMPACTION FACTOR TEST:

Compacting component of fresh bond is done to choose the handiness of the new concrete by compacting segment test. The compacting factor mechanical assembly is utilized to decide the compaction factor of cement with low, medium and high use fulness.

Table : Compaction Factor

Sl. no	% Replacement	Compaction factor
1	0 %	0.847
2	5 %	0.884
3	10 %	0.982
4	15 %	0.991

IV. RESULTS AND DISCUSSIONS

The results of compressive and tensile test with partial replacement of recycled coarse aggregate is tabulated.

COMPRESSIVE STRENGTH TEST:

The compressive test of concrete is tested for 0%, 5%, 10% & 15%. The table below shows compressive strength of concrete.

Si. No	% Replacement	cubes (N/mm²) 7 days	Cubes (N/mm²) 14 days	Cubes (N/mm²) 28 days
1	0 %	16.55	22.42	29.67
2	5 %	18.30	24.85	31.42
3	10 %	13.06	20.71	26.56
4	15 %	10.90	15.62	20.12

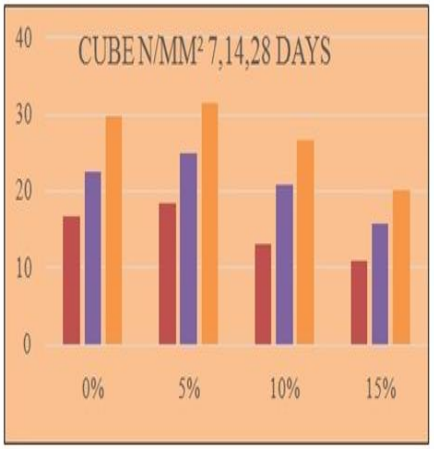

Fig1 : compressive strength of cube

SPLIT TENSILE STRENGTH:

The tensile test of concrete is tested for 0%, 5%, 10% & 15%. The table below shows tensile strength of concrete.

Table: Split Tensile Strength Of Cylinders

Si. No	% Replacement	Cylinders (N/mm²) 7 days	Cylinders (N/mm²) 14 days	Cylinders (N/mm²) 28 days
1	0 %	1.03	1.87	2.70
2	5 %	2.49	3.32	4.15
3	10 %	2.07	2.91	3.74
4	15 %	1.03	1.87	2.70

TABLE 6: split tensile strength of cylinder

V. CONCLUSION

In this experimental study, the cubes & cylinder were casted with the various percentages of recycled aggregates (0%, 5%, 10%, and 15%) in the concrete.

1. Workability of concrete increases when various percentages of recycled aggregates.
2. Specimen casted with OPC + recycled aggregate (5%) shows the maximum compressive strength.

3. Specimen casted with OPC + recycled aggregate (5%) shows the maximum tensile strength.

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