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Application of Different Agricultural Waste in Concrete as a Partial Replacement of Cement

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Abstract**—***The aim of this investigation is to study the variation in strength characteristics of concrete structures, with M20 grade. In each mix containing different percentages of sugarcane ash and rice Husk ash, is super-imposed by incorporating some proportion of starting from 0% as normal concrete, i.e. controlled concrete and 10%, 20%, and 30%, as test concrete*

Keywords:—*Concrete, sugarcane ash and rice Husk ash, structural-characteristics, test concrete.*

1. INTRODUCTION

How does solid fit into this mind boggling world situation of the development business? The answers are straightforward yet colossal. Whatever be its constraints, solid as a development material is still rightly seen and distinguished as the supplier of a country's foundation and in a roundabout way, to its monetary advancement and strength, and to be sure, to the personal satisfaction. It is so effectively and promptly arranged and created into a wide range of possible shapes and auxiliary frameworks in the domains of base, residence, transportation, work and play. Its incredible straightforwardness lies in that its constituents are most promptly accessible anyplace on the planet; the colossal excellence of cement, and presumably the significant reason for its poor execution, then again, is the way that both the constituents' decision, and the proportioning of its constituents are completely in the engineer's hands and the technologist. The most extraordinary nature of the material is its inborn alkalinity, giving a passivating component and a safe, non-consuming environment for the steel support implanted in it. Long experience and a decent comprehension of its material properties have affirmed this perspective, and demonstrated to us that solid can be a dependable and tough development material when it is inherent shielded conditions, or not presented to forceful situations or specialists. In fact, extensive proof notwithstanding when presented to decently forceful situations, solid can be intended to give long inconvenience free administration life gave care and control are practiced at each phase of its generation and manufacture, and this is trailed by all around arranged investigation and support plans. All through the world, the waste transfer expenses have heightened extraordinarily. In the meantime, the solid development industry has understood that the waste materials are modest and broadly accessible by-item that can be utilized for halfway bond substitution to accomplish phenomenal workability in new solid blends. It offers a comprehensive answer for the issue of taking care of expanding requests for solid later on in an economical way and at a diminished or no extra cost. By this study we can diminish the ecological effects that are essential to monetary

advancement. The need of this concentrate likewise offers the innovation of Rice husk ash, Sugarcane Bagasse concrete, which are required for framework and lodging in a savvy and biological way. There is an immediate connection in the middle of toughness and asset profitability. The utilization of waste materials like Rice husk ash, Sugarcane Bagasse Ash, will help to upgrade the solid's manageability industry. There is a significance to protect nature in the present day world. Mechanical and horticulture waste materials like Rice husk ash, Sugarcane Bagasse Ash, are making genuine ecological danger and ways are being considered to arrange them. These materials are really a super pozzolan since they are rich in Silica. In this manner we can utilize more non-ordinary materials in development and expend the common assets also. Rice husk ash, Sugarcane Bagasse Ash, are such a non-traditional materials which are discovered effortlessly and can be utilized as a part of solid industry to give great quality at lower expense.

2. METHODOLOGY

For this research project 150mm * 150mm * 150mm concrete cube is casted with different waste material, material is used for this project, natural coarse aggregate of 20 mm maximum size, natural river sand and OPC cement of 43 grade. All these ingredient and waste material are locally collected and mix design is done as per IS 10262 : 2009 and mix is prepared with different with industrial and agricultural waste with different mix name and also control concrete mix has been prepared. Curing of this specimen is done at room temperature in clear water.

3. EXPERIMENTS & RESULT

Different materials utilized all through exploratory projects led on crisp and solidified cement for different blends. Different test like workability, compressive quality are clarified here and This section manages the presentation of test outcome, and examination on compressive quality improvement of control cement and rice husk ash, Sugar bagasse ash Concrete at distinctive curing period. The present examination depends on the IS strategy for control concrete. husk ash Sugar bagasse ash are incompletely supplanted by bond in cement and at distinctive curing period, trial blend of M20 of control cement is made by outlined blend plan. Compressive quality and Workability conduct of husk ash, Sugar bagasse ash are examined where in the impact age and rate supplanting of bond with husk ash, on compressive and Workability is concentrated on in correlation with that of M20 Grade control concrete. Likewise water assimilation studies are additionally done.

4. EXPERIMENTAL PROGRAM

Table 1: Casting and Curing of M20 Grade of Concrete with 0% Fly Ash

Particular	Mix Design	Code	No. of Specimen	Curing period In days	Cube size
Cube	M20	M1	9 no's	7, 14, 28	150x15x 150mm

Table 2: Casting and curing of M20 grade of concrete with 10% cement replaced by Rice husk ash.

Particular	Mix Design	Code	No. of Specimen	Curing period In days	Cube size
Cube	M20	M2	9 no's	7, 14, 28	150x15x 150mm

Table 3: Casting and curing of M20 grade of concrete with 20% cement replaced by Rice husk ash.

Particular	Mix Design	Code	No. of Specimen	Curing period In days	Cube size
Cube	M20	M3	9 no's	7, 14, 28	150x15x 150mm

Table 4: Casting and curing of M20 grade of concrete with 30% cement replaced by Rice husk ash.

Particular	Mix Design	Code	No. of Speci-men	Curing period In days	Cube size
Cube	M20	M4	9 no's	7, 14, 28	150x15x 150mm

Table 5: Casting and curing of M20 grade of concrete with 10% cement replaced by sugarcane ash.

Particu-lar	Mix Design	Code	No. of Speci-men	Curing period In days	Cube size
Cube	M20	M5	9 no's	7, 14, 28	150x15x 150mm

Table 6: Casting and curing of M20 grade of concrete with 20% cement replaced by sugarcane ash.

Particular	Mix Design	Code	No. of Specimen	Curing period In days	Cube size
Cube	M20	M6	9 no's	7, 14, 28	150x15x 150mm

Table 7: Casting and curing of M20 grade of concrete with 30% cement replaced by sugarcane ash.

Particular	Mix Design	Code	No. of Specimen	Curing period In days	Cube size
Cube	M20	M7	9 no's	7, 14, 28	150x15x 150mm

Table 8: Casting and curing of M20 grade of concrete with 10% cement replaced by 5% sugarcane ash and 5% Rice husk ash.

Particular	Mix Design	Code	No. of Specimen	Curing period In days	Cube size
Cube	M20	M8	9 no's	7, 14, 28	150x15x 150mm

Table 9: Casting and curing of M20 grade of concrete with 20% cement replaced by 10% sugarcane ash and 10% Rice husk ash.

Particular	Mix Design	Code	No. of Specimen	Curing period In days	Cube size
Cube	M20	M9	9 no's	7, 14, 28	150x15x 150mm

Table 10: Casting and curing of M20 grade of concrete with 30% cement replaced by 15% sugarcane as and 15% Rice husk ash.

Particular	Mix Design	Code	No. of Specimen	Curing period In days	Cube size
Cube	M20	M10	9 no's	7, 14, 28	150x15x 150mm

Slump Cone Test:

Table 11: Description of workability and magnitude of slump

Description of workability	*Slump in mm*
No slump	0
Very low	5-10
Low	15
Medium	35
High	80
Very high	160 to collapse

Table 12: Workability of various concrete mixes design for slump cone test is as follows

Mix design codes	Slump cone test in mm.
M1-MIX (normal concrete)	38
M2-MIX (10% Rice husk ash)	42
M3-MIX (20% Rice husk ash)	43
M4-MIX (30% Rice husk ash)	45
M8-MIX (10% Rice husk ash and10% sugarcane ash)	47
M9-MIX (20% Rice husk ash and20% sugarcane ash)	48

Table No. 13: Workability of various concrete mix design for compaction factor test

Serial No.	Mix Design Code	Compaction Factor
1	M1	0.81
2	M2	0.82
3	M3	0.84
4	M4	0.85
5	M8	0.87
6	M9	0.90

Details of Specimens Used:

150mm x 150mm x150mm cube specimens for Compressive strength.

Testing of Materials:

Cement:

Ordinary Portland Cement of 53 Grade confirming to IS: 8112-1989 was used in the investigation

OPC

Water [IS: 456-2000]:

Water used for both mixing and curing should be free from injurious amount of deleterious materials such as acids, alkalies, salts, organic materials etc. Potable water is generally considered satisfactory for mixing and curing concrete. In present work potable tap water was used.

4. CONCLUSIONS

Compressive strength, of sugarcane ash and rice Husk ash based reinforced concrete specimens were higher than the plain concrete (Control Mix) sugarcane ash and rice Husk ash and concrete specimens at all the ages. The strength differential between the plain concrete specimens and reinforced concrete specimens became more distinct after at 28 days. The replacement of cement with 10% 20% and 30% sugarcane ash and rice Husk reduced the compressive strength of concrete. It has been observed that as the percentage of sugarcane ash and rice Husk increases the compressive strength increases initially, on further increase in its percentage reduces its compressive strength.

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