AN EXPERIMENTAL INVESTIGATION OF RICE HUSK ASH AND WASTE PAPER SLUDGE ASH AS PARTIAL REPLACEMENT OF CEMENT

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ABSTRACT: Concrete is the mixture of cement, sand, aggregates with or without admixture. Concrete is widely used now a days in the construction industry. If we incorporate the paper sludge and rice husk which are obtained from the paper mill and processing of rice respectively. By adding these components into cement it increases the strength, flexural and compressive strength of concrete. These materials (RHA and WPSA) were added at varying percentage, it not only increase the compressive, tensile and flexural strength but also replaces the cement content. Thus also contributes to prevent pollution because during the manufacturing of cement also high amount of co2 is released. Hence it also prevents our green environment.

I. INTRODUCTION

Concrete is widely used in construction industries. In this moern era, it plays a vital role in any contruction work. It is the mixture of cement, fine aggregates, course aggregates and water. The cost of these construction materials is increasing day by day because of high demand, scarcity of raw materials. The way by whichwe can replace these materials is by using alternative materials and those materials are called supplementary cementing materials which not only reduce the cement content but also increase the strength of concrete flexural, compressive and tensile strength of concrete

1.1 MATERIAL USED:-

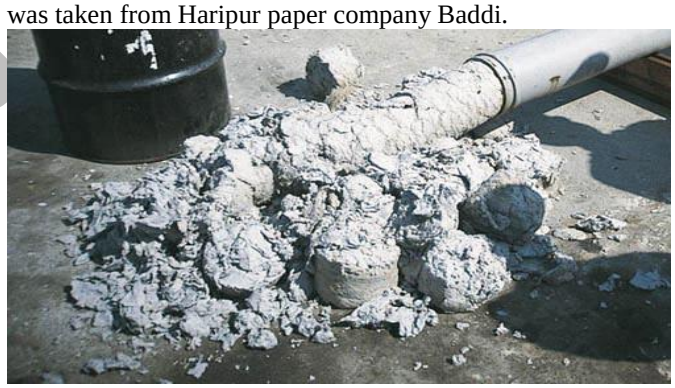
CEMENT:- In this experimental work ordinary portland cement (OPC) of 53 grade was used throughout the course of the investigation and the properties of the opc 53 grade are as:-

S.NO	CHARACTERISTICS	VALUE OBTAINED EXPERIMENTAL	VALUE SPECIFIED BY IS 12269:1987
1	Specific Gravity	3.10	3.10 - 3.15
2	Standard Consistency	31%	30 - 35
3	Initial Setting Time	115 minutes	30 min (minimum)
4	Final Setting Time	283 minutes	600 min (maximum)
5	Compressive Strength (n/mm2) After 7 days	38.49 N/mm2	37 N/mm2
	After 28 days	52.31 N/mm2	53 N/mm2

RICE HUSK ASH:- Rice Husk Ash (RHA) is the by product obtained from the burning of rice husk. It is available in India in large quanties by adding this product with concrete. The pozzolanic reactivity of

the ash is closely related to from silica present and carbon content.

WASTE PAPER SLUDGE ASH:- The waste material comming from paper mill is the biggest challenge to environment to keep it green even in this modern era. If we utilize this material in the construction industry it not only increase the strength of concrete but also solve our problem. It also reduce the cement content. The waste paper sludge was taken from Haripur paper company Baddi.



Test 2:- Physical properties of waste paper ash.

APPEARANCE	FINE POWER
PARTICLE SIZE	SIEVED THROUGH 90 MICRON SIEVE
COLOUR	DARK GRAY
SPECFIC GRAVITY	2.09
P.H	5.2 - 6.6

FINE AGGREGATES:- Aggregates constitute the bulk of a concrete mixture and give dimensional stasisty to concrete. The constituents when added to concrete increases the strength of concrete.

Test 3:- Properties of fine aggregates

CHARACTERISTICS	VALUE
SPECIFIC GRAVITY	2.63
BULK DENSITY	5%
FINESS MODULES	2.83

COARSE AGGREGATES:- In this experimental locally available river aggregate of sie 20mm was used in this work. The aggregates were tested as per IS 383-1970.

Test 4:- Properties of coarse aggregates:-

CHARACTERISTICS	VALUE
TYPE	CRUSHED
COLOUR	GREY
SHAPE	ANGULAR
NOMINAL SIZE	20 mm
SPECIFIC GRAVITY	2.62
FINENESS MODULUS	8.05

TABLE:- The mixture proportions are used in experimentation work are shown.

MIX	%	W/C RATIO	WATER (kg/m^3)	CEMENT (kg/m^3)	FINE AGGREGATE (kg/m^3)	COARSE AGGREGATE (kg/m^3)	RHA (kg/m^3)	WPSA (kg/m^3)
RICE HUSK ASH	0	0.50	186	372	562	1217	-	-
	5	0.50	186	353.4	562	1217	18.6	-
	10	0.50	186	334.8	562	1217	37.2	-
	15	0.50	186	316.2	562	1217	55.8	-
	20	0.50	186	297.6	562	1217	74.4	-
WASTE PAPER SLUDGE ASH	5	0.50	186	353.4	562	1217	-	18.6
	10	0.50	186	334.8	562	1217	-	37.2
	15	0.50	186	316.2	562	1217	-	55.8
	20	0.50	186	297.6	562	1217	-	74.4
MIXTURE OF RHA & WPSA	5	0.50	186	353.4	562	1217	9.3	9.3
	10	0.50	186	334.8	562	1217	18.6	18.6
	15	0.50	186	316.2	562	1217	27.9	27.9
	20	0.50	186	297.6	562	1217	37.2	37.2

1.2 CASTING:- Before casting is done the moulds were cleaned and oiled properly. Twelve sample were casted out of which six cubes are selected for compressive strength and six are taken for split tensile strength test. Casting was done with varying percentage of RHA & WPSA of 5%, 10%, 15%, 20% respectively.

II. CONCLUSION

The conclusion of this experimental work is that under the optimum dosage of RHA and WPSA under varying percentages 5%, 10%, 15% and 20%. The compressive strength, split strength and flexural strength increases.

FUTURE SCOPE:-

The experimental work of this present investigation needs more investigation if we extent beyond 20% RHA & WPSA. These are several areas in which future work can be extended.

Some tests relating to aspects such as water permeasility, resistance to penetration of chloride ions, corresion of steel reinforcement, durability in marine environment etc.

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