

AN EXPERIMENTAL INVESTIGATION OF INCORPORATION OF FLY ASH WITH CONCRETE

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ABSTRACT: We know in this modern era, construction industry focused on many new innovations and with this many new things focused the concrete engineers to think about them and replace the plain conventional concrete. As for this present experimental investigation is considered we had replaced fine aggregates with fly ash and found that the compressive strength increased on addition of fly ash. If we use this product it can reduce the carbon dioxide emission and also increases flexural, compressive and split tensile strength and we use the varying percentage of fly ash 5%, 10%, 15% and 20% and found that maximum strength gained the concrete specimen at the percentage of 15%.

Keyword: Fly ash, Mineral Admixture, Split tensile strength.

I. INTRODUCTION

Fly ash concrete is the mixture of cement, fine aggregate, coarse aggregate and the addition of fly ash in it makes the concrete more durable and strong. It also replaces the fine aggregate but not completely replaces it in this word there is not such kind of material still found which completely replaces it in this word there is not such kind of material still found which completely replaces the cement and have the same properties like the cement. So if we add the fly ash it can reduce the quantity of cement and helps reducing the level of carbon dioxide emission. As we know during manufacturing of cement, the process involves large amount of carbon dioxide emission to the environment and also if we properly not manage this fly ash obtained. The combustion of coal also pollutes the land, water. So if we add this in our concreting operations. It will help us lot in making environment green and clean and also improves the quality of concrete.

II. LITERATURE REVIEW

As for the literate review is concussed many researchers worked on fly ash and concluded that the addition of fly ash with concrete increases the strength concrete some of the views of the researchers are as Chatterjee [1]. He concluded that the 50% of fly ash can be utilized into concrete and we can replace the 70% replacement of cement Neville [2] the author concluded that the aggregate cement ratio is any factor in the strength of concrete it can contribute in its strength if we add fly ash in concrete Pofale and Deo [3] they concluded that with the addition of fly ash with concrete it increases compressive strength, about 20% and increases flexural strength 15% and replacing 27% of sand. Rao [4] the author concluded that about 650kg/cu. M of fine aggregate is

required to make self-compacting concrete. We can replace this by fly ash and can meet the requirements. At fine aggregate up to some quality. Siddique [5] He carried his experimental investigation on the mechanical properties of concrete mixes in which fly ash replaced the fine aggregate (sand) and concluded that the it increases the strength of concrete (Flexural and modulus of elasticity)

III. EXPERIMENTAL WORK

1. MATERIAL USED. Following material was used in this experimental work

CEMENT: - The cement of 43 grade of OPC was used and the properties of cement are as:-

Properties of cement

S.NO	TEST	RESULT
1	Fineness of cement	97.75
2	Initial setting time	35m
3	Final setting time	57m
4	Specific gravity of cement	3.15

FINE AGGREGATE

The fine aggregate was locally available and the experimental work which was on the fine aggregates are as.

COARSE AGGREGATE

The coarse aggregate of size 20mm was taken and the experimental work which was conducted on the coarse aggregates are as Sieve analysis of coarse aggregate

FLY ASH

The Fly ash which was used in this experimental work was 2.91. The chemical properties of Fly ash are given in below

Table 4: Chemical Properties of fly ash

Chemical properties of minimum % by mass	IS code	Fly ash sample
SIO ₂ +AL ₂ O ₃ +FE ₂ O ₃	70	85
SIO ₂	35	56
CAO	5	4
SO ₃	2.75	1.9
NA ₂ O	1.5	2.1
LOI	12	4
MGO	5	1



Fly ash

WATER

The water which was used in this work was collected from tap. Which was free from dust and other salts and fulfilling all the requirements as per IS Code 456-2000

IV. RESULTS AND DISCUSSION

The results of compressive, split tensile and flexural strength are as under.

4.1 COMPRESSIVE STRENGTH

The compressive strength which was obtained at the 7 days and 28 days are as under

Table 5: Compressive strength

Replacement	7days	28days
MX0	15.03	28.43
MX5	18.73	31.85
MX10	19.55	32.21
MX15	21.99	33.99
MX20	19.47	30.07



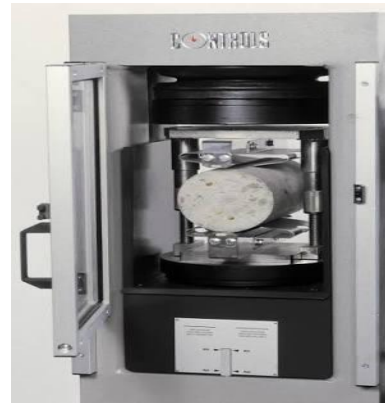
Compressive test

4.2 SPLIT TENSILE STRENGTH

The split tensile strength of specimen at 7 days and 28 days are as under The result of split tensile strength is given below.

Table 6: Split tensile strength

Replacement	7days	28days
MX0	1.38	3.01
MX5	1.62	3.6
MX10	1.8	3.81
MX15	1.90	4.47
MX20	1.73	3.76



Split strength test

4.3 FLEXURAL STRENGTH

The flexural strength test which was conducted at the 7 days and 28 days are as

Table 7: Flexural strength

Replacement	7days	28days
MX0	1.26	2.34
MX5	1.42	2.89
MX10	1.71	3.22
MX15	2.09	4.04
MX20	1.8	3.17



Flexural test

V. CONCLUSION

The conclusion of this experimental work are

- The experimental work showed that the properties of M30 concrete when it is added with Fly ash increases the strength of concrete
- The experimental work also showed that the compressive strength was increased up to 10%
- The experimental work also showed that the Flexural strength was increased 15%
- The experimental work also showed that the split strength was increased 20%
- The experimental work showed that the maximum strength of concrete was gained at the dosage of 15%

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