RECRON MEDIUM STRENGTH FIBRE REINFORCED CONCRETE

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Abstract

The use of blended cement is becoming common in these days owing to the attempts made by the researchers in the direction of utilization of materials, which are available in natural abundantly . The new additives fly ash and Recon -3s, which is tried in recent times without any scientific study was found to be satisfactory . While , there is much to be done in order to standardize the properties of the said additives.An attempt is made in the present work to investigate of these additives on the compressive strength of cement concrete. The experimental study of this investigation consists of design of concrete mixes for two different characteristic mean strengths. The mix was worked out giving certain proportions by keeping the obtained water- cement ratio constant.

These two mixes were obtained with water-cement ratio as 0.40. For each of the above mix, Different percentages of additive (fly ash) was replaced, that is 20%, 25% and 30% by weight of cement by keeping the second additive (Recron-3s) as 0.25% by weight of cement.

I Introduction

Certain organic compounds(additives) are used in concrete. A new additives called Recron-3s is used to the two mixes designed with different percentages od additive (fly ash), and then its effects are observed in improving the compressive strength of concrete as well as cost.

According to Indian standard code for "Plain and Reinforced Concrete -Code of Practice" Is 456:2000 a medium strength concrete is in range of M25-M55. Medium strength of concrete is much familiar in India in constructing multi storied buildings to overcome the uncertainties after curing concrete additive are introduced in concrete especially organic fibre's

II Objectives and Scope

The main purpose of this study To investigate the influence of additives fly and recron3s(fiber). The strength characteristics of the concrete (M30 and M35) were used with varying percentage of additives and changes in strength, gain in strength and workability parameters were studied.

In the present work, an effort is made to use new additives as the ingredients of concrete and study the effects on M30 and M35 grade concrete. The scope of work is limited to find out the behavior of concrete in compression and its cost.

III Experimental Review

The fundamental involved in the productive high performance concrete in the selection of material like cement, sand, coarse aggregate etc. 53 grade Ambuja cement brand of cement was used. Locally available sand and course aggregate were made use of in this study. These materials were tested for their basic properties and the results are tabulated in the appendix.

The objective of this study was to study compressive strength parameters of M30, M35 grades of concrete. Since the focus was to produce HPC of medium strength, no specific mix design procedure was under taken and nominal mix for M30 (1:1.5:3) and M35 (1:1:2) and adopted throughout study. Initially the mix where the grades of concrete adopted were designed using IS code method. Subsequently for different percentages (%) of additives, the variations in strength were studied. The percentage of additives adopted were 20%, 25% and 30% of fly ash and 0.25% of recron-3s by weight of cement.

168 concrete cubic specimens of size 15 X 15 X 15 CMS were prepared. The water cement ratio is

0.40. concrete cubes with 0 (plain),(20,25 and 30-percentage additives (fly ash) and 0.25) percentage additives (Recron-3s) by weight of cement was used.

Recron-3s is a fiber material. It is a by-product of fuel Extraction at Jamnagar, Gujarat. It is mainly used to prevent dampness and leakages.

The effect of admixture on the setting time of cement was evaluated from the laboratory tested. It retarded the setting time. The setting time of the cement is 93 minutes for ordinary cement and the setting time with 0.25% admixture by weight of cement is 115 minutes.

Figure 1: Recorn 3s Fibre

Table1: Compressive Srength of Concrete (M30) For Different Percentages of Additives For W/C Of 0.4

COMPRESSIVE STENGTH(N/mm^2)				
FLY ASH %	**3DAYS**	**7DAYS**	**14DAYS**	**28DAYS**
0	14	27.6	31	37
20	21	28.2	32.2	37
25	24	30	32.8	36
30	26	31	33	36

Table2: Compressive Strength of Concrete (M35) For Different Percentages of Additive For W/C Of 0.4

COMPRESSIVE STENGTH(N/mm^2)				
FLY ASH %	**3DAYS**	**7DAYS**	**14DAYS**	**28DAYS**
0	16	30.4	33	39
20	24	30.4	34	39
25	26	34	35	39
30	28	35	35	36

Table3:Compressive Strength of Concrete (M30) For Different Percentages of Additives For W/C Of 0.4.

COMPRESSIVE STRENGTH(N/mm^2)					
Recro	**Flyas**	**3DAY**	**7DAY**	**14DAY**	**28DAY**
.25	0	16	30	34	43
.25	20	22	31	48	45
.25	25	27	32	47	50
.25	30	28	32	51	52

Table4: Compressive Strength of Concrete (M35) For Different Percentages of Additives For W/C Of 0.4.

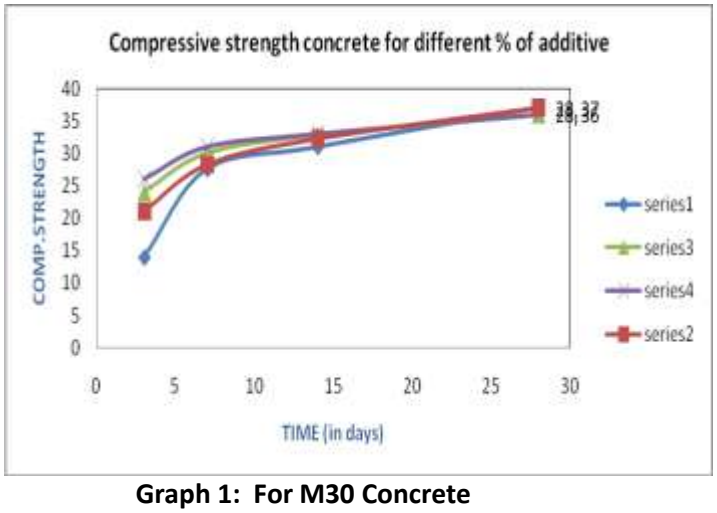
COMPRESSIVE STRENGTH(N/mm^2)					
Recro	**Flyas**	**3DAY**	**7DAY**	**14DAY**	**28DAY**
.25	0	18	34	36	48
.25	20	24	34	56	50
.25	25	30	34	54	56
.25	30	30	32	60	60

Table5: Cost Estimation

Assumed Additive Mix Ratio	**M30 RS/m^3**	**M35 RS/m^3**
Plain cement concrete	1935	2249
Plain cement concrete with 20% flyash replacement	1735	2049
Plain cement concrete with 25%	1708	1989

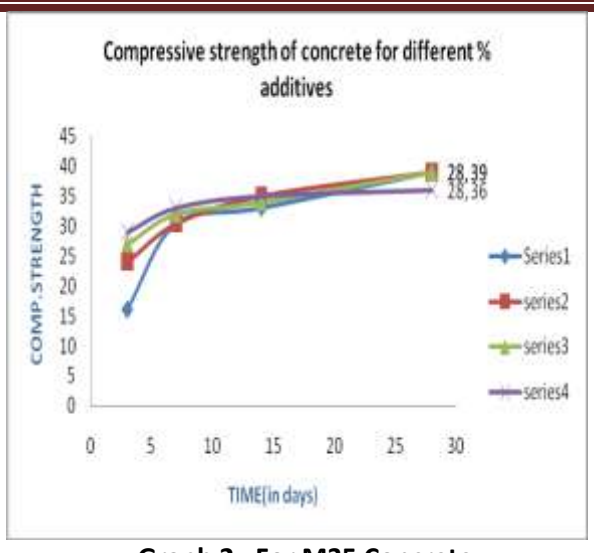
flyash replacement		
Plain cement concrete with 30% flyash replacement	1642	1929
Plain cement concrete with 20% flyash replacement & addition of .25% Recron-3s	1995	2304
Plain cement concrete with 20% flyash replacement & addition of .25% Recron-3s	1944	2228
Plain cement concrete with 20% flyash replacement & addition of .25% Recron-3s	1875	2150

Comparative Graphs



Graph 1: For M30 Concrete

Where,
Series 1 represents 0% Fly Ash.
Series 1 represents 20% Fly Ash.
Series 1 represents 25% Fly Ash.
Series 1 represents 30% Fly Ash.



Graph 2 : For M35 Concrete

Where,
Series 1 represents 0% Fly Ash.
Series 1 represents 20% Fly Ash.
Series 1 represents 25% Fly Ash.
Series 1 represents 30% Fly Ash.

IV CONCLUSION

1. The 28 days in respect of both grades of concrete is attaining maximum value at 25-30% of flyash replacement. [See graph no: 1and 2]
2. There is an increase of 12%in compressive strength with addition of flyash when compared plane concrete [See graph no:1]
3. There appears to be greatest increase in 7 days strength with usage of flyash when compared 28 days strength. Nearly 25% more strength is reported to have been secured at 7 days with 25% replacement of flysah this has an advantage in terms of early de-shuttering and when the base of construction is expected to be very high there is a similar tendency absorbed and infact more pronouncedly at 3days strength of concrete there is a 50% increase in strength at 3 days compared plane conventional concrete [See graph no;1]
4. The addition of recron fiber has further increased initial 3days and 7days strength as evident from the table no.3.[See graph no:3 and 4]

5. These fibers are causing 30% f increase in the 28-days compressive strength in the presence of flyash the maximum in 28-days strength is observed with 0.25% recron and 25% flyash substitution. [See graph no: 3]

BOARD CONCLUSION ON COSTING ASPECTS

1) There is a reduction in the cost of extent of 5% with the 30% flyash replacement and addition of 0.25% Recron with a concurrent increase of 25% strength.

2) The addition of only fly ash is reduction the cost by 15% but the incremental gain in strength is limited to about 10%.

3) A table detailing cost of various grades of concrete at various percentages of fly ash Recron is indicated.

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