

Influence of Dosage of Super Plasticizer on the Mechanical Properties of Binary Blended Concrete

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ABSTRACT--- *Women are an equal soul of men by comprises men in her name itself but really they are treated equal among men. There is a broad gap in between past and present centuries. Women are treated poorly on past centuries by getting huge works, asking more dowries and even killing female infant but in present century these has been reduced and crimes are increased more in numbers against women like abducted, murdered, raped and harassed in various ways. This assessment is on women's tracking system which helps them in their safety and security. Although there are n numbers of tracking devices still crimes against women are in an increasing rate. These crimes have to be reduced in an effective ways of implementing versatile tracking system by combining various technologies into a single integrated unit.*

Keywords— Audio and Image, GPS, GPRS, GSM, Sensors.

1.0 INTRODUCTION

Mineral and chemical admixtures play a vital role in the strength enhancement of concrete. The chemical admixtures have the ability to increase the workability of the concrete considerably and also imparts strength enhancement of the concretes considerably. In India, the chemical admixtures are generally used in the construction of high rise structures, long span bridges and in ready mix concretes and at present, various chemical and mineral admixtures are available in the market as per the needs of the users,

The advantages will be found when chemical admixtures produce high workable concretes imparting in strength by keeping the objective for placing. It also produces concrete with low water requirements and workable concrete with less cement content. Use of chemical admixture is increasing now a days because of its possessing advantages for both fresh and hardened stages of concrete. The use of chemical admixtures in concretes have positive effects on the fresh and hardened properties of the concrete. In the fresh stage, use of chemical admixture will generally reduces the bleeding effects due to the decrease in water content. Also, the use of mineral admixtures in concrete increases the mechanical properties of the concrete as well as the durability of the concrete.

With the increase in the dosage of chemical admixture, the concrete leads to gain good ability in addition to slump. Further, over dosage of chemical admixture found to deteriorate the properties of concrete with reporting of lower

compressive strengths [1]. Modified poly carboxylic ether found more effective than chemical admixtures. At better degree of workability and mechanical properties. If the low dosages of chemical admixtures are used than optimal dosage, increase in mineral admixture dosage will help in enhancing the characteristics of concrete [2]. The compressive strength of concrete subjected to high ambient temperatures is significantly influenced by the curing period in wet condition and also the addition of chemical admixture [3]. Over dosages of chemical admixtures were found to decrease the properties of concrete resulting in lower compressive strengths and higher porosity [4]. Optimum percentage of 7.5% mineral admixture silica fume and metakaoline gives better results in terms of hardened properties of cement concrete [5,6].

The present results showed in this study gave a far better results than when compared with the ordinary controlled concrete on par with the mechanical properties of the controlled concrete. In this study, it was aimed to develop a sustainable concrete by utilizing the mineral and chemical admixtures as a replacement to conventional cement concrete so as to increase the mechanical properties of the concrete.

2.0 EXPERIMENTAL DETAILS

Mix design considered in the present study is M 35 grade concrete as per IS 10262:2009 code with normal constituents of concrete like locally available UltraTech OPC 53 grade cement. River sand and mechanically crushed 20 mm conventional granite. The experimental investigation was divided into two phases. In the first phase of investigation, it was aimed to develop and identify the optimum dosage of mineral admixtures viz., fly ash and GGBS. In the second phase of investigation, the obtained optimal mix was tested for various dosages of chemical admixture viz., HI-FORZA 245. The workability test results for various replacement levels of mineral admixtures are presented in Table 1 and the corresponding details are pictorially depicted in Fig 1. Further, The mechanical properties in the similar lines were presented in Table 2 and Fig. 2. The optimal mix obtained in this study is shown via Table 3 with various replacement levels of chemical admixtures. Pictorial representations of the same are shown in Fig. 3 and Fig. 4.

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INFLUENCE OF DOSAGE OF SUPER PLASTICIZER ON THE MECHANICAL PROPERTIES OF BINARY BLENDED CONCRETE

2.0 RESULTS AND DISCUSSION

2.1 WORKABILITY TESTS FOR FRESH CONCRETE

Table 1 : Workability tests for various replacements levels of mineral admixtures to cement

S.No	Mix Description	Mix Designation	% of mineral admixtures	Slump Cone Test (mm)	Compaction factor	Vee-bee test (sec)
1.	M35 CM	M1	0	60	0.84	5
2.	(5%+5%) FA+GGBS	M2	10	60	0.86	6
3.	(5%+10%) FA+GGBS	M3	15	50	0.88	8
4.	(10%+5%) FA+GGBS	M4	15	55	0.86	8
5.	(7.5%+7.5%) FA+GGBS	M5	15	58	0.85	7
6.	(10%+10%) FA+GGBS	M6	20	50	0.89	8

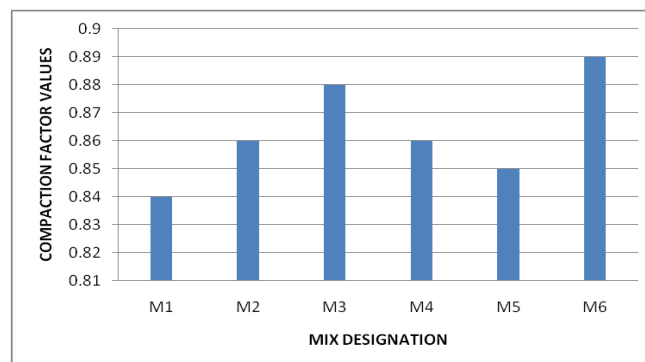
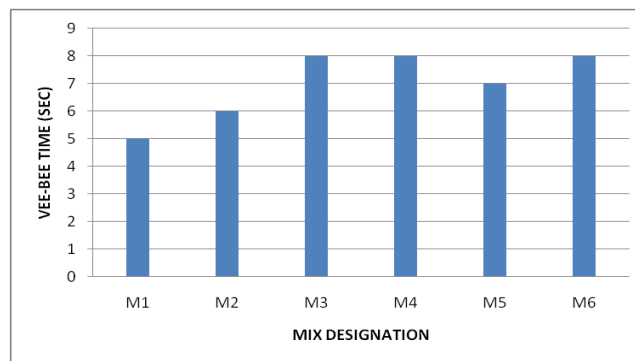
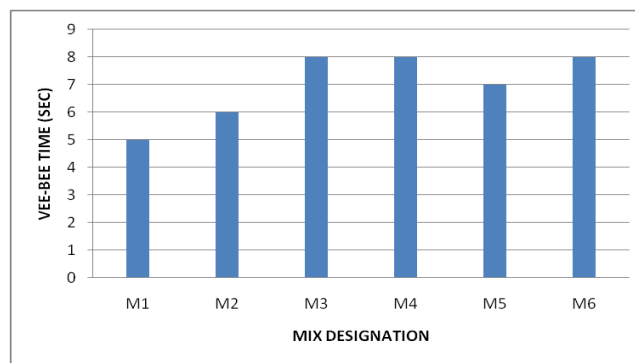


Fig. 1 Workability test results for slump cone, compaction factor and vee-bee time for mineral admixture replacement to cement

From Table.1 , Fig.1,it is observed that as the percentage replacement levels of blended mineral admixture increases, the fresh properties of concrete decreases and for mix M5, it was found to be effective of all the mixes and it was considered for the further study.

Table 2: Test results of M35 grade concrete with various replacements of mineral admixtures to cement

S.No	Mix Description	Mix Designation	% of mineral admixtures	Compressive Strength (MPa)	Split-tensile strength (MPa)	Flexural Strength (MPa)
1.	M35 CM	M7	0	43.33	3.82	5.20
2.	(5%+5%) FA+GGBS	M8	10	44.00	3.86	5.25
3.	(5%+10%) FA+GGBS	M9	15	44.44	3.89	5.30
4.	(10%+5%) FA+GGBS	M10	15	43.11	3.80	5.18
5.	(7.5%+7.5%) FA+GGBS	M11	15	45.33	3.91	5.49
6.	(10%+10%) FA+GGBS	M12	20	44.00	3.78	5.20

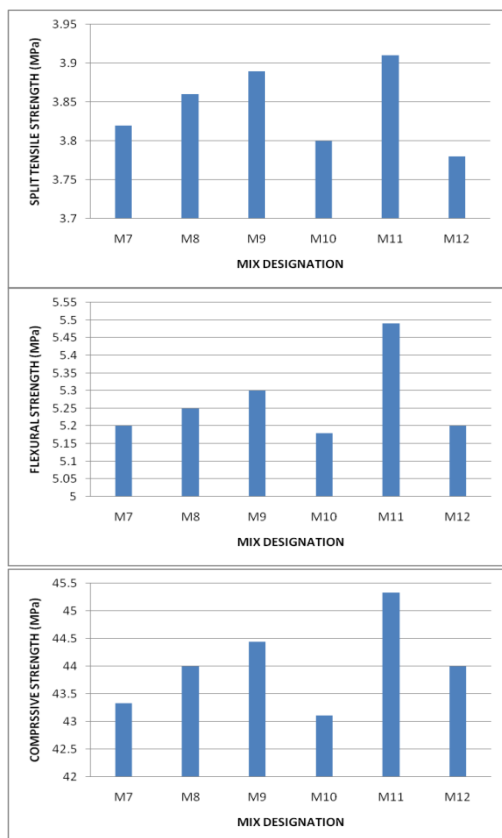
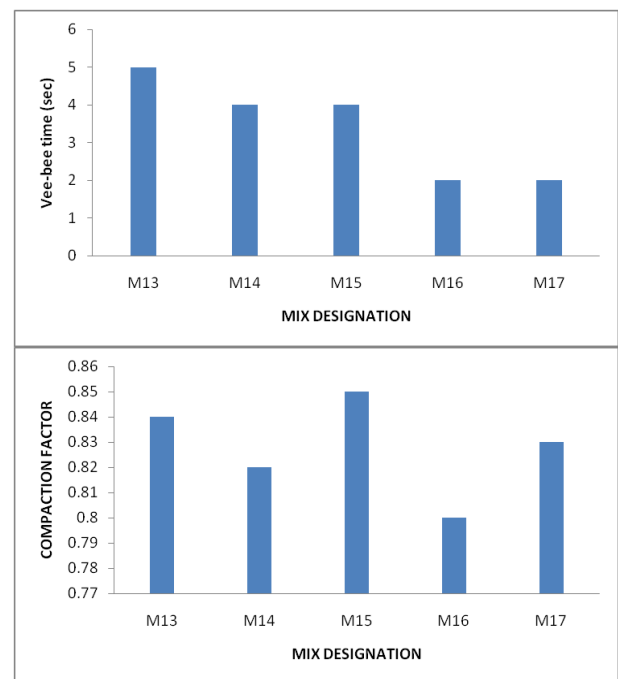


Fig. 2 Mechanical properties of M35 grade concrete with mineral admixture replacement to cement

From Table.2 , Fig.2,it is revealed that as the percentage replacement levels of blended mineral admixture increases, the hardened properties of concrete increases and for mix M11, it was found to be effective of all the mixes.

Table 3: Test results of M35 grade concrete with various replacements of chemical admixtures

S.No	Mix Description	Mix Designation	% of chemical admixtures	Slump Cone Test (mm)	Compaction factor	Vee-bee test (sec)
1.	M35 CM	M13	0	60	0.84	5
2.	(7.5%+7.5%) FA+GGBS	M14	0.5	58	0.82	4
3.	(7.5%+7.5%) FA+GGBS	M15	1	65	0.85	4
4.	(7.5%+7.5%) FA+GGBS	M16	1.5	75	0.80	2
5.	(7.5%+7.5%) FA+GGBS	M17	2	85	0.83	2



INFLUENCE OF DOSAGE OF SUPER PLASTICIZER ON THE MECHANICAL PROPERTIES OF BINARY BLENDED CONCRETE

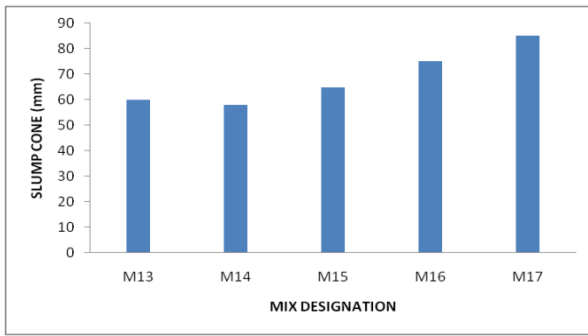


Fig. 3 Workability test results for slump cone, compaction factor and vee-bee time for mineral and chemical admixture replacement to cement

From Table.3 , Fig.3,it is evident that as the percentage replacement levels of chemical admixture increases, the fresh properties of concrete increases for 15% replacement of SP and for mix M16, it was found to be effective of all the mixes and it was considered for the further study.

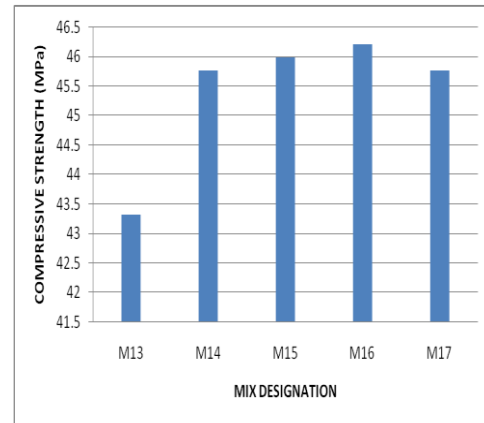
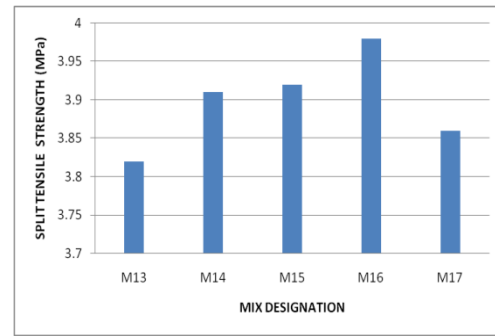


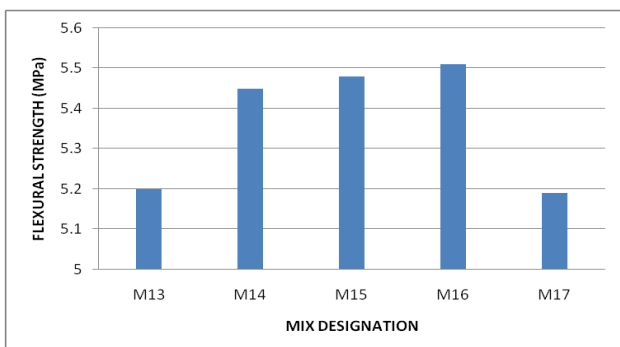
Fig. 4 Mechanical properties of M35 grade concrete with mineral admixture replacement to cement and use of chemical admixture

From Table4 and Fig4, it can be concluded that as the percentage replacement levels of blended mineral and chemical admixture increases, the hardened properties of concrete increases and for mix M16, it was found to be effective of all the mixes.

Workability in all aspects regarding the mineral and chemical admixtures, the ratios of slump cone decreased , compaction factor increased and also the vee-bee time increases and also increased in the case of both mineral and chemical admixtures.

Table 4: Mechanical properties of M35 grade concrete with various replacements of chemical admixtures

S.No	Mix Description	Mix Designation	% of chemical admixtures	Compressive Strength (MPa)	Split-tensile strength (MPa)	Flexural Strength (MPa)
1.	M35 CM	M13	0	43.33	3.82	5.20
2.	(7.5%+7.5%) FA+GGBS	M14	0.5	45.77	3.91	5.45
3.	(7.5%+7.5%) FA+GGBS	M15	1	46.00	3.92	5.48
4.	(7.5%+7.5%) FA+GGBS	M16	1.5	46.22	3.98	5.51
5.	(7.5%+7.5%) FA+GGBS	M17	2	45.77	3.86	5.19



3.0 CONCLUSIONS

With the increase in the percentage replacement of mineral admixture to cement, the fresh properties were found to be decreased and showed lower levels of workability. The optimum replacement level of mineral admixture was found to be at (7.5%FA+7.5%GGBS) and was reported a high compressive strength value of 45.33 MPa and the percentage increase in compressive strength was found to be 4.62%.The optimum replacement level of chemical admixture was found to be at (7.5%FA+7.5%GGBS) 1.5% super plasticizer and was reported a high compressive strength value of 46.22 MPa and the percentage increase in compressive strength was found to be 6.66%.With the use of chemical admixture, the fresh properties as well as the hardened properties were increased for (7.5%FA+7.5%GGBS) M35 grade concrete. Workability in all aspects regarding the mineral



and chemical admixtures, the ratios of slump cone decreased, compaction factor increased and also the vee-see time increases and also increased in the case of mineral admixtures & chemical admixtures.

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