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EVALUATE THE PROPERTIES OF CONCRETE PREPARED USING ALCCOFINE

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***Abstract*— There has been dependence over the cement as the binding material only being used from decade due to which Supplementary cementitious materials (SCM) are becoming popular in the construction industry due to continue rise in the cost as well as their environment impact are huge too. Alccofine is a new generation micro fine concrete material for high Strength Concrete which is important in respect of workability as well as strength. The aim of this paper is to highlight the importance of Alccofine as Supplementary cementitrious materials in construction industries. This can be used as a SCM due to its ultrafine size and high content of calcium oxide (Cao), Alccofine1203 is essential in terms of reducing heat of hydration and strength at all stages where as Alccofine 1101 can be used as a grouting purpose.In this paper, the compressive strength of the concrete prepared using Alccofine after the variation of its percentage w.r.t. fine aggregate has been done. The concrete prepared is of grade M30.**

***Index Terms*— Alccofine, Concrete grade, mechanical properties.**

I. INTRODUCTION

Alccofine is a new generation, micro fine material of particle size much finer than other hydraulic materials like cement, fly ash, silica etc. being manufactured in India. Alccofine has unique characteristics to enhance 'performance of concrete' in fresh and hardened stages due to its optimized particle size distribution. It can be used as practical substitute for Silica Fume as it has optimum particle size distribution not too coarse, not too finer either per the results obtained by Counto Micro fine products Pvt. Ltd (A joint venture with ambuja cement ltd and alcon developers). It is manufactured in the controlled conditions with special equipments to produce optimized particle size distribution which is its unique property.

In this project a control mix of concrete of grade M30 grade has been prepared and 3 sample each with partial replacement with cement of 5%, 10%, 15% respectively has been casted whose various strength are checked after 3 days, 14 days, 28 days respectively. The result of the above studies with an aim of finding the optimum value of replacement has been shown in the study.

II. MATERIAL AND METHODS

The various type of material used in casting process of concrete are: fine aggregate, course aggregate, cement, water and Alccofine manufactured by by Counto Micro fine products Pvt. Ltd

MIX DESIGN (M_{30})

Test data for materials

SR NO.	MATERIAL	PROPORTION
1	Specific gravity of cement	3.15
2	Specific gravity of coarse aggregates	2.78

3	Specific gravity of fine aggregates	2.32
4	Zone of fine aggregates	II
5	Water absorption of coarse aggregates	0.43%
6	Water absorption of fine aggregates	0.88%

Table 1: Proportion of Material Used

III. RESULT AND DISCUSSION

1. COMPRESSIVE STRENGTH TEST:

12 number of test specimens of size 150x 150x 150 mm were prepared for testing the compressive strength concrete. The concrete mixes with varying percentages (0%, 5%, 10%, 15%) of alccofine as partial replacement of fine aggregate (cement)were cast into cubes. In this study, to make concrete, cement and fine aggregate were first mixed dry to uniform color and then coarse aggregate was added and mixed with the mixture of cement and fine aggregates. Water was then added and the whole mass mixed. The interior surface of the moulds and the base plate were oiled before concrete was placed. After 24 hours the specimens were removed from the moulds and placed in clean fresh water. The specimens so cast were tested after 7, 14 and 28 days of curing measured from the time water is added to the dry mix. The load was applied axially without shock till the specimen was crushed. Results of the compressive strength test on concrete with varying proportions of Alccofine replacement at the age of 7 and 28 days are given in the Table 2

Mix(%)	**Average Compressive Strength after 7 days**	**Average Compressive Strength after 14 days**	**Average Compressive Strength after 28 days**
0	18.02	22.91	27.27
5	19.29	22.95	31.44
10	21.12	23.92	34.93
15	18.5	22.75	30.20

Table 2: Compressive Test Result

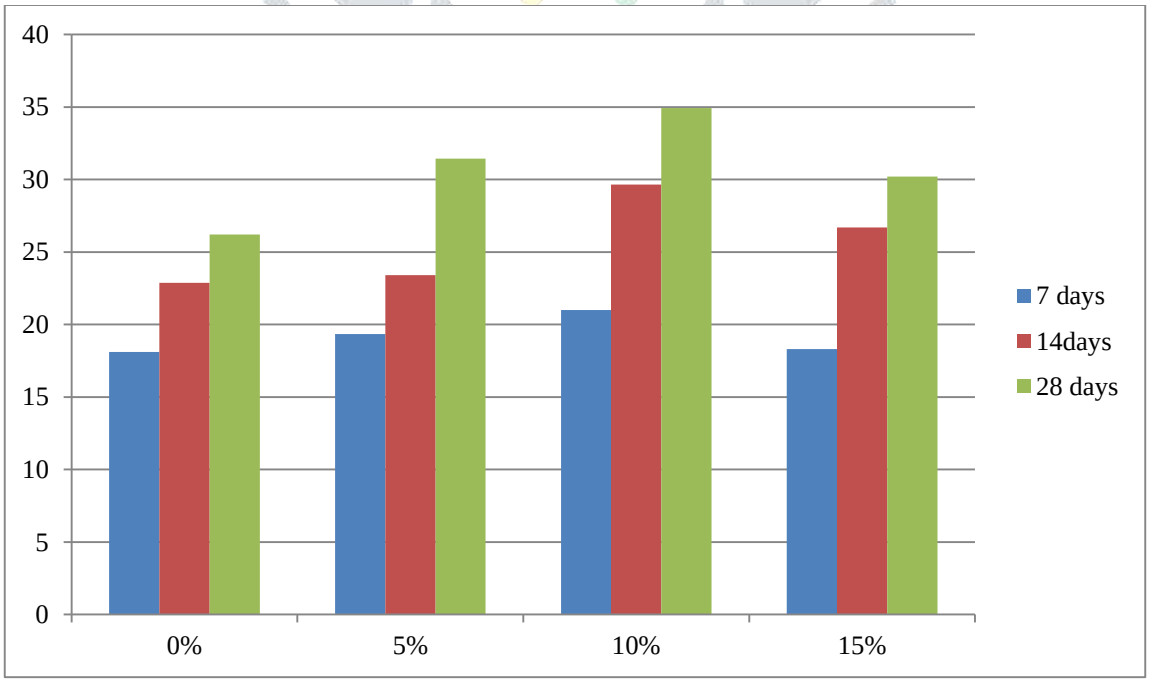

Figure 1: Comparison of compression test according to days

2. SPLIT TENSILE STRENGTH TEST

12 number of Test specimens of size 150x 300 mm i.e. cylinder were prepared for testing the split tensile strength of concrete. As done in case of cubes, the concrete mixes with varying percentages (0%, 5%, 10%, 15%) of Alccofine as partial

replacement of fine aggregate (cement) were cast into cylinders for subsequent testing. The splitting tensile strength test actual consists of applying a diametric compressive load along the entire length until failure occurs. This loading induces tensile stresses on the plane containing the applied load and compressive stresses in the area around the applied load. Results of the compressive strength test on concrete with varying proportions of Alccofine replacement at the age of 7 and 28 days are given in the Table 3

Mix(%)	Average Split Tensile Strength after 7 days	Average Split Tensile Strength after 14 days	Average Split Tensile Strength after 28 days
0	2.62	3.28	4.53
5	2.82	3.90	4.57
10	3.94	4.04	4.93
15	3.35	3.66	4.43

Table 3: Compressive Test Result

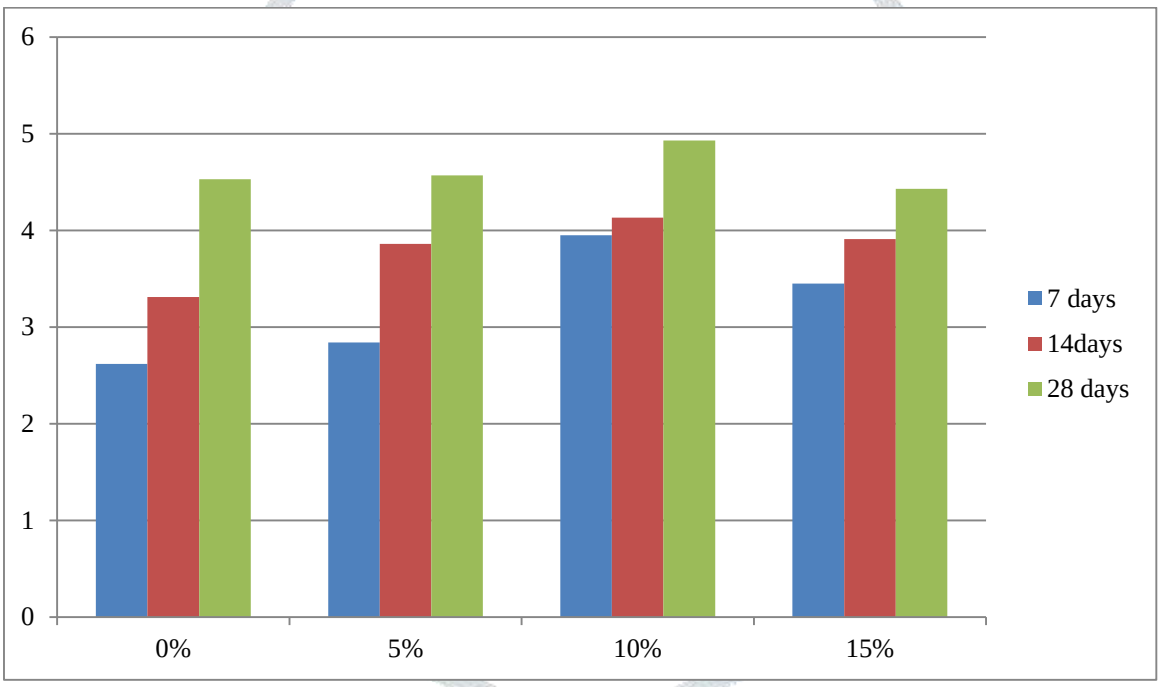

Figure 2: Comparison of STS

IV. CONCLUSION

1. The compressive strength increases as compared to control mix as the percentage of Alccofine is increased. After adding 5% Alccofine in the mix, there is an increase in compressive strength after 7 days, 14 days and 28 days respectively as compare to control mix. After 10% there is decrease in compressive strength. At 10% there is enormous increase in compressive strength of cube.
2. The optimum value of compressive strength comes at 10%.
3. There is no much change observed in the STS even up to 10 % but decrease in the strength is observed on adding 15%.

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