

# Study On Properties of Concrete with Partial Replacement of Alccofine as Cement

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## Abstract:

The main scope of this study is to evaluate the properties of concrete with partial replacement of Alccofine as cement. In the current century the scarcity of cement is an important factor. So many researchers are focusing to find a best alternative material for cement. In Concrete cement acting as a binding material because it has both cohesive and adhesive property. In this work we replaced Alccofine as cement in the range from 10 percentage to 40 Percentage. The fresh and hardened properties of concrete with Alccofine as cement was found and the results compared with normal conventional concrete without any replacement.

**Keywords —Fresh property, Hardened Property, Alccofine, Cement Replacement.**

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## I. INTRODUCTION

The concrete is an largely used in an construction areas for different type of structures due its structural alignment and strength. The ordinary Portland cement is one of the most ingredient used for the manufacturing of concrete and as an alteration in the civil industries. In a construction areas concrete plays major role structural element. The concrete is identified as one of the best materials in construction areas for the present situation. Alccofine 1203 blocks are the building of an structure for all mechanical units, in which they are constructed with including mortar. The meaning blocks can be an part of mechanical units itself. Alccofine 1203 blocks are new generation blocks can be used for various construction purposes these microfine material has high compressive strength and increasing the strength of the blocks.

About an these microfine material is an new generation product which was seen by Ambuja constructions, they knew that these material as an high compressive strength of the various masonry works. Taking these products for the experimental purposes can be known that it shows an high strength, more durable, effective than other microfine materials.

## II. OBJECTIVES OF STUDY

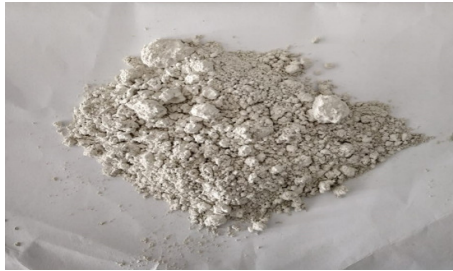
The main objectives of this study is to evaluate the suitability of Alccofine as cement and also to find the fresh and hardened properties of concrete made with Alccofine replacement as cement.

## III. MATERIAL PROPERTY

### Alccofine

It is an microfine material with less calcium silicate chemical and is an porous material with

self-healing properties, it can be used for the high raised buildings, roads, bridges, ports etc., with more over concrete industries.



**Figure 1: Alccofine**

Property	Values
Average particle size	4-6
Fineness	1200
Specific gravity	2.62-0.02
Bulk density	600-700

**Table 1: Properties of Alccofine**

SiO <sub>2</sub>	35.01%
Al <sub>2</sub> O <sub>3</sub>	22.02%
Fe <sub>2</sub> O <sub>3</sub>	0.91%
CaO	34.01%
So <sub>3</sub>	0.11%
MgO	6.50%

**Table 2: Composition of Alccofine**

### Cement

Selection of type of cement mainly depends on the specific requirements of concrete. It determines the strength and properties of fresh and hardened concrete. The Cement used for all the specimens were ordinary Portland cement (43 grades) with a specific gravity of 3.15 and conforming to IS: 8112-2013.

### Fine Aggregate

Locally available river sand conforming to grading zone II as per IS: 383-1970 is used. The specific gravity was found to be 2.66.

### Coarse Aggregate

The coarse aggregate is the strongest and least porous component of concrete. Locally available

blue granite stones of maximum size of 20 mm are used. The specific gravity was found to be 2.64.

### Water

Potable tap water from available in the laboratory with pH value 6 to 8 and conforming to the requirements of IS: 456-2000 is used for mixing concrete and curing the specimens as well.

### IV. MIX DESIGN

The concrete Mix Design was prepared by using IS 10262 Code. Mix ratio given in following Table 3.

CEMENT	CA	FA	W/C
325	745	1160	0.50
1	2.31	3.48	0.50

**Table 3: Mix Design**

### V. EXPERIMENTAL INVESTIGATION

#### Fresh Properties of Concrete

Workability of all the trail mixes were found using slump test and the values obtained are detailed in the Figure 2



**Figure 2: Slump Test**

S.No	Mix type	Slump value
1	Conventional	82
2	M1 ( C90:AL10)	85
3	M1 ( C80:AL20)	87
4	M1 ( C70:AL30)	88
5	M1 ( C60:AL40)	91

**Table 4: Slump Test Result**

### Hardened Properties of Concrete

The 150 mm size concrete cubes, 150mmX300mm cylinders and concrete beams of size 100 mm x 100 mm x 500 mm has been cast to determine the compressive strength, split tensile strength and flexural strength respectively (Fig.3 to Fig.5).



Figure 4: Compressive Strength Test



Figure 5: Split Tensile Strength Test



Figure 6: Flexural Strength Test

### VI. RESULTS AND DISCUSSION

#### Workability

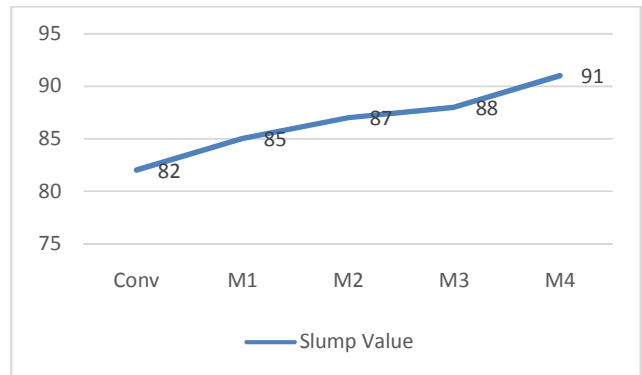


Figure 7: Slump Value

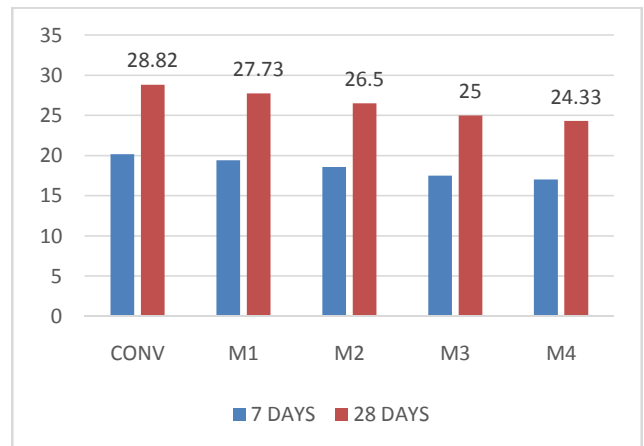


Figure 8: Compressive Strength

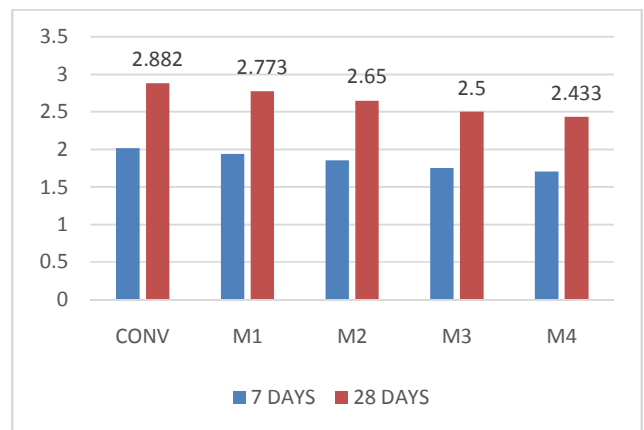


Figure 9: Split Tensile Strength

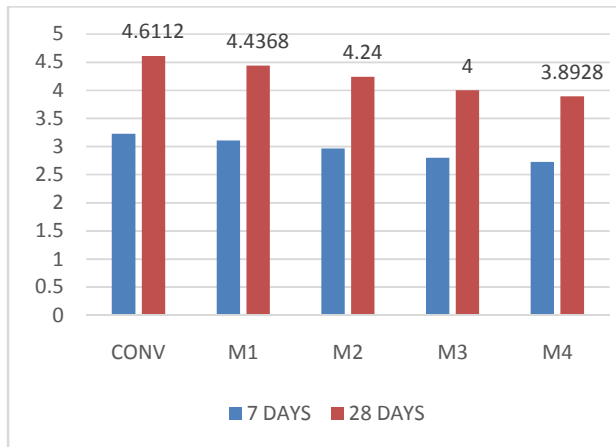


Figure 10: Flexural Strength

## VII. CONCLUSIONS

The Following Conclusions were drawn from this experimental Investigations

- ❖ The workability of Concrete with 60 percentage cement + 40 percentage Alccofine produces maximum Workability comparing all other mixes(Conventional, M1 (C90: Al 10), M2 (C80: Al 20), M3 (C70: Al 30).
- ❖ At the age of 7 and 28, Concrete with 10 % Alccofine replacement produces more or less similar Strength when compared to conventional Concrete.
- ❖ From results, we got to know that Alccofine have similar property by comparing cement. So it would be considered as best replacement material for cement.

## REFERENCES

- [1] L. Priyanka, Dr.D.S.V. Prasad, Dr.A.C.S.G. Prasad “A study on strength characteristics of flyash with additives”, ISSN: 2349-6002, Vol, Issue 8, Jan 2016.
- [2] Ravi Kumar, Deepankar Kr. Ashish, Najia L. “ Properties of Non-Conventional (Fly ash) Bricks: An Experimental Study”, (IJETT)- Volume 24 Number 4- June 2015.
- [3] Saurabh Gupta, Dr. Sanjay Sharma, Er. Devendra Sharma, “ A Review of Alccofine : A Supplementary cementitious material”, International Journal of modern trends in engineering and research, ISSN : 2349-9745.
- [4] Alccofine by Counto Micro fine Products Pvt. Ltd.

- [5] Siddharth P Upadhyay Prof, M.A.Jamnu “Effect on Compressive Strength of high performance concrete incorporating alccofine and fly ash” ISSN, Volume 2 Issue 2.
- [6] Rajesh Kumar, Dilip k. Singha “ An experimental study on the mechanical properties of alccofine based high grade concrete” International journal of Multidisciplinary Research and Development.
- [7] I.S.516-1975, “Method of Tests for Strength of Concrete”, Bureau of Indian Standard, New Delhi.
- [8] Yatin H Patel, 2P.J.Patel, 3Prof. Jignesh M Patel, 4Dr. H S Patel, 2013, IJAERS, presented- Concrete With Alccofine And Fly Ash’ Study On Durability Of High Performance Concrete With Alccofine And Fly Ash.
- [9] IS 2386 (Part 4), 1963, “Methods of Test for Aggregates for Concrete, Part IV, Mechanical Properties”, Bureau of Indian Standard, New Delhi, 1963.
- [10] Patel P. J . & H. S. “Effect on compressive and flexural strength of high performance concrete incorporating Alccofine and Fly Ash, International Journal of Civil, Structural, Environmental and Infrastructure Engineering Research and Development, Vol. 3, Issue 2, 2013, 109-114.