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EFFECT OF ALCCOFINE ON MECHANICAL PROPERTY OF CONCRETE

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Abstract : In the present study present development of convenience concrete using Alccofine. In a study make a M30 grade of concrete. The mix design is done by as per IS:10262:2019. In this comparative study take the Alccofine 5%,10%,15% and 20% a total weight of concrete. Adding this percentage in concrete see the which percentage is more convenient for concrete and which percentage produce a high performance. And after check the compressive strength, flexural strength, split tensile test. Check this test for 7days, 14 days , 28 Days. It can be observed from the result that compressive strength of concrete using alccofine is more than convenience concrete. From the result it can be observed that at 28 days compressive strength of concrete is 34 N/mm^2

Key words : Alccofine, compressive strength, flexural strength, split tensile.

I. Introduction :

Alccofine micro material are a range of product of counto microfine product pvt.ltd. A joint venture between ACL and goa-based, Alcon group lunched in group 2013.The two product that have been launched Alccofine 1203 and 1101.It is a new generation ultrafine product whose basic row material is slag of high glass content with high reactivity obtain through the process of controlled granulation. The raw materials are composed primarily of low calcium silicate. The processing with the other select ingredient results in controlled size distribution. Due its unique chemistry and ultrafine particle size, Alccofine 1203 provide reduce water demand for given workability, and they can also use high rant water reducer to improve compressive strength. Physical property and chemical property of Alccofine 1203 are represented in table1 and table2 respectively.

Table-1: Physical property of Alccofine

Specific gravity	Bulk density (kg/m^3)	Particle size distribution		
2.9	600-700	D10	D50	D90
		1-2	4-5	8-9

Table-2: Chemical parameters of Alccofine 1203

CaO	Al_2O_3	SiO_2	Glass content
31-33%	23-25%	33-35%	>90%

II. Experimental program :

In this comparative study take the Alccofine 5%,10%,15% and 20% a total weight of concrete. Adding this percentage in concrete see the which percentage is more convenient for concrete and which percentage produce a high performance. And after check the compressive strength, flexural strength, split tensile test and they are tested for 7 days, 14 days and 28 days.

Table-3 : Quantity required in 1Kg/m^3.

Material	Alccofine 5%	Alccofine 10%	Alccofine 15%	Alccofine 20%
Cement	420.41	415.09	409.77	404.45
Water	189.19	186.8	184.41	182.02
Coarse Aggregate	1086.09	1072.34	1058.59	1044.84
Fine Aggregate	700.28	691.42	682.56	682.56
Alccofine	30.32	60.64	90.96	121.28

a) Compressive strength test :

Compressive strength (MPa) = (Failure load) / (cross section area of cube specimen) (1)

b) Split tensile test :

$T = 2P / \pi LD$ (2)

Where:

T = split tensile strength, MPa

P= maximum applied load indicated by the testing machine, N

D= diameter of specimen, mm

L= length of specimen, mm

c) Flexural strength test :

$Fb = [(P \times l) / (b \times d2)]$ (3)

When 'a' is greater than 20.0 cm for 15.0 cm specimen, or greater than 13.3 cm for a 10.0 cm specimen, or Flexural Strength,

Fb = [(3P x a) / (b x d2)] (4)

When 'a' is less than 20.0 cm but greater than 17.0 cm for 15.0 cm specimen, or less than 13.3 cm but greater than 11.0 cm for a 10.0 cm specimen.

Where,

b = measured width in cm of the specimen,

d = measured depth in cm of the specimen at the point of failure,

l = length in cm of the span on which the specimen was supported and,

p = maximum load in kg applied to the specimen

d) Result obtained

First take the trial test of mix-design and in this test cannot add the Alccofine. After 28 days get this result. This test is only for the Mix-design clarification. After 28 days getting compressive strength of cube 31 N/mm^2.

In this comparative study adding Alccofine 5%,10%,15% and 20% and getting result. After the result getting maximum strength in 10% add Alccofine. Alccofine material density is very low. That's way getting minimum strength in 20% add Alccofine.

Table-4: Compressive strength result after 28 days

Alccofine (%)	Compressive strength result(N/mm^2)
5	30
10	34
15	29
20	26

Table-5: Mechanical property of concrete.

Test	Result after 7 days	Result after 14 days	Result after 28 days
Compressive strength	21.8	27.4	34.0
Split tensile	2.82	3.58	4.80
Flexural strength	3.73	4.80	5.33

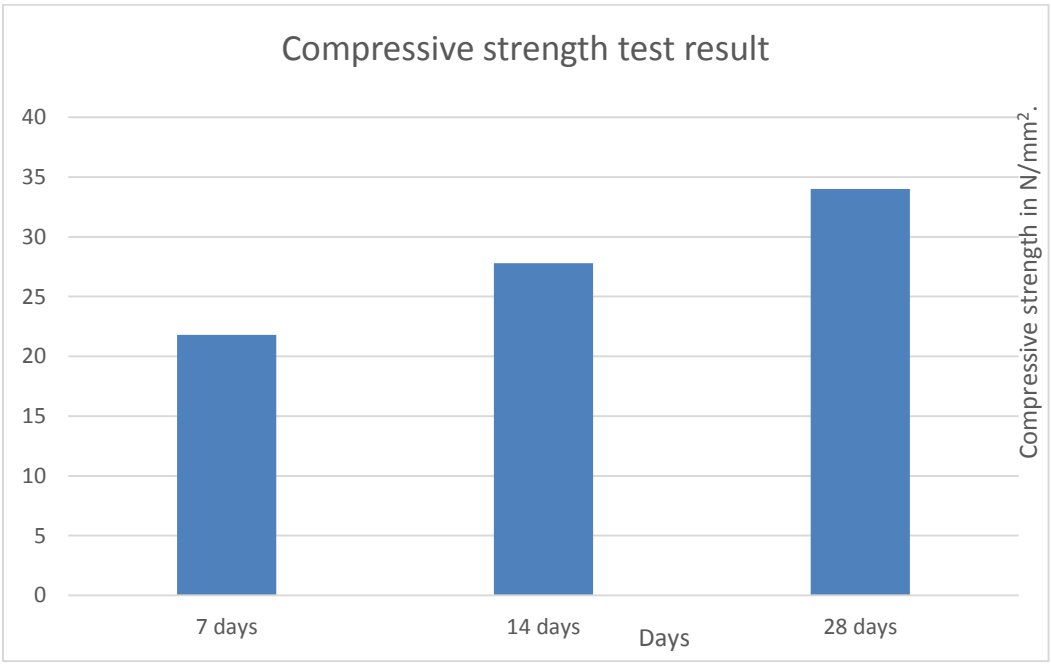

Chart-1: Compressive strength test result

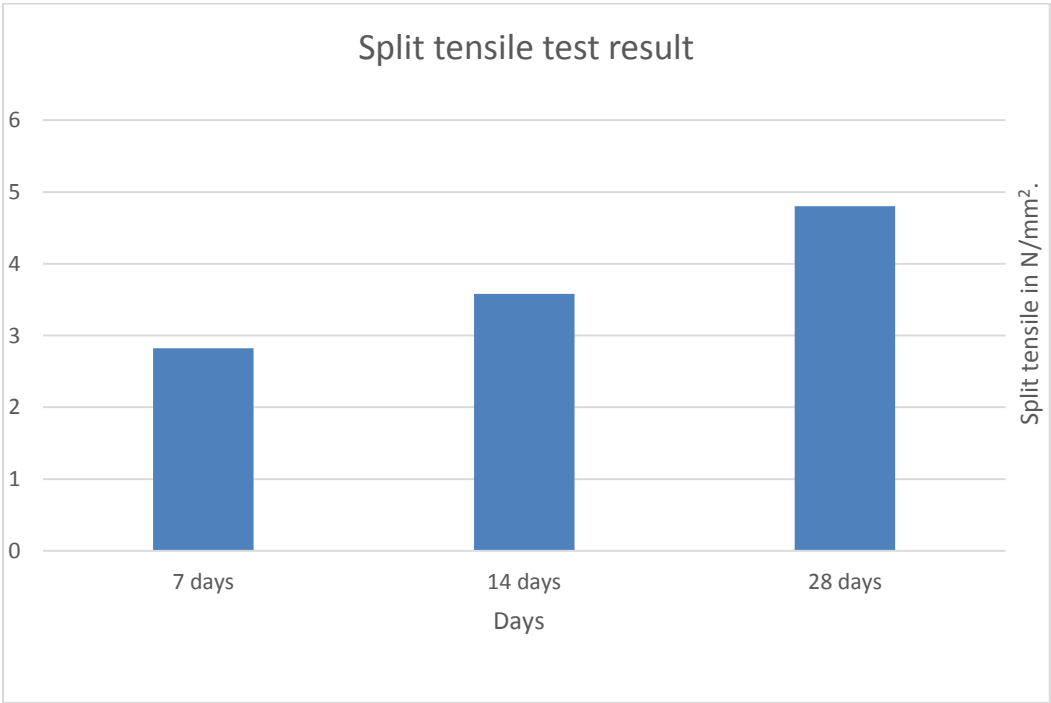

Chart-2: Split tensile test result

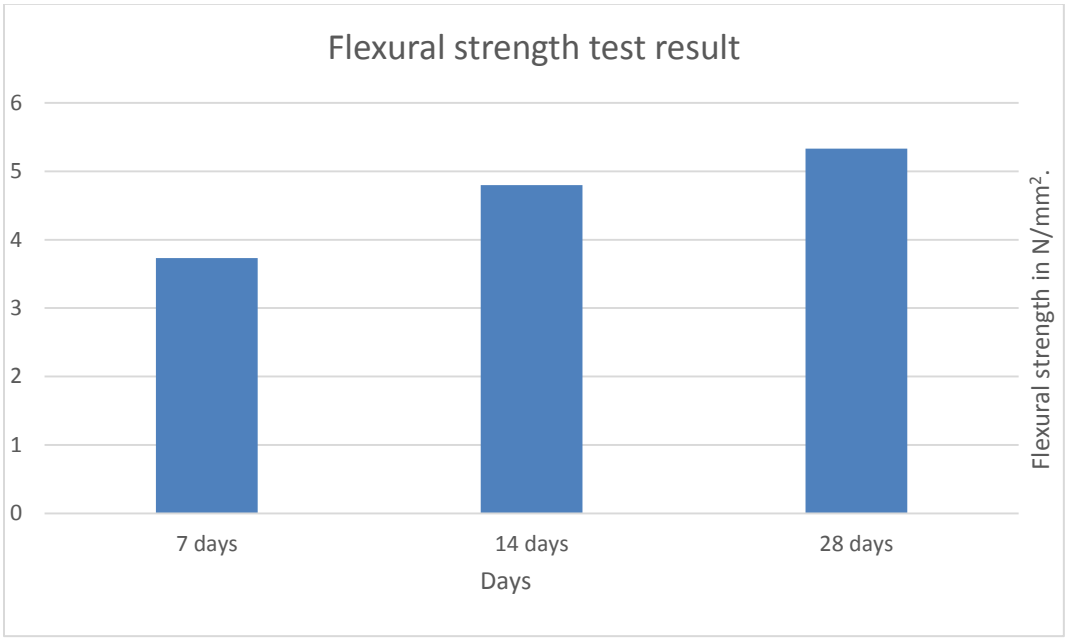

Chart-3: Flexural strength test result

III. Conclusion:

1. The addition of Alccofine increase the property like filling ability, passing ability and resistance to segregation.
2. Hardened property of Concrete with 10% Alccofine are superior than Concrete with 5%,15% and 20% of Alccofine.
3. As per the cost concern Alccofine is cheaper than cement so for better strength and durability of concrete it should be promoted in Indian construction industries.

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