ISSN XXXX XXXX © 2019 IJESC

Research Article Volume 9 Issue No.3

Study of N100 as a Cement Reducer

SagareKiran K[1], Mali Shradha .M[2], VhatteVaishnavi .V[3], Samashette .M[4], Bukka .R .S[5]
Student[1, 2, 3, 4], Lecturer[5]
Department of Civil Engineering
Vishveshwarayya Abhiyantriki Padvika Mahavidyalay, Almala, India

Abstract:
N100 is the form of silica fume. The study of this chemical is an experimental on the nature of N100 and its influences on the properties of fresh concrete. The partially replacement of cement by N100 the strength parameters of concrete have been studied. Firstly the strength parameters of concrete without any partial replacement were studied then strength parameters by partial replacement with N100 have been studied by placing cube on compressive testing machine (CTM).In this project we are reducing cement content by 15% by adding N100 chemical with various proportion like 0.7%, 0.8%, 0.9% of weight of cement. The result showed that partial replacement of cement with N100 has significant effect on the compressive strength of cube. The strength of concrete increases rapidly, as we increase N100 content and optimum value of compressive strength is obtained at 0.9% replacement. After 1% it starts decreasing under uniform load condition.

Keywords: Compressive strength, N100 Chemical, Concrete, cement, Aggregate

1. INTRODUCTION:

N100 is the liquid form of NEST BUILD known as concrete class upgrading admixture. N100 works a water reducer during mixing and pumping. While transportation and placement it acts as a plasticizer. N100 plays role as a shrinkage controller and curing compound during setting and a strength gainer and impermeability performing agent at hardening time. N100 has a density of 1.10kg/lit. With a PH value 8-9 and has blackish liquid in color. N100 falls under the classification of following type of ASTM:

1) **Type C :** cement hydration accelerator

2) **Type F :** high range water reducing admixture

3) **Type S :** specific performance admixture

1.1 FIELD APPLICATION OF N100

- N100 is concrete class upgrading admixture applicable where concrete, grout or plaster need to be without shrinkage cracks, efflorescence and post hardening deformation, water/vapour proof and stable to ecological & industrial corrosion (PH <3)
- Reduction of cement by 15% to 20% plus elimination of other admixture
- Concrete floors and roads are more economical by 36% and 4th day because of no dilatation cuts, curing and surface installation passes
- Foundation, liquid supply canal, sewer, sea port docks & pools economical by 44% on at 6th to 14th day
- Wall panels & blocks, roofs, poles , pillars and decks economical by 30% on 7th day
- Inter-repair terms for sewer, chemical & agricultural structures are longer by 2 times

2. EXPERIMENTAL PROCEDURE:

Experimental procedure is based on research article on “study of partial replacement of cement by silica fume” by Lakbhir Singh, Arjun Kumar& Anil Singh.

2.1 Materials: The required strength or target strength of concrete can be obtained by careful selection of ingredients, correct grading of ingredients, accurate water measurements and adopting a good workmanship in mixing.

2.2 Aggregate: Aggregates constitute the bulk of a concrete mixture and give dimensional stability to concrete. The aggregates provide about 75% of the body of the concrete and hence its influence is extremely important. They should therefore meet certain requirements if the concrete is to be workable, strong, durable and economical. The aggregates must be proper shape, clean, hard, strong and well graded.

2.3 Coarse aggregate: The aggregate which is retained over IS Sieve 4.75 mm is termed as coarse aggregate. The coarse aggregates may be of following types:

1. Crushed graves or stone obtained by crushing of gravel or hard stone.
2. Uncrushed gravel or stone resulting from the natural disintegration of rock
3. Partially crushed gravel obtained as product of blending of above two types.

The normal maximum size is gradually 10-20 mm; however particle sizes up to 40 mm or more have been used in Self Compacting Concrete. Locally available coarse aggregate having the maximum size of 20 mm was used in this work. The aggregates were washed to remove dust and dirt and were dried to surface dry condition. The sieve analysis of coarse aggregate was done. Proportioning of transporting, placing, compacting, finishing and curing of concrete in the construction work. Different materials used in present study were cement, coarse aggregates, fine aggregates, water and N100. The aim of studying of various properties of materials is used to check the appearance with codal requirements and to enable an engineer to design a concrete mix for a particular strength.

2.4 Ordinary Portland cement: Although all materials that go into concrete mix are essential, cement is very often the most important because it is usually the delicate link in the chain. It constitutes only about 20 percent of the total volume of concrete mix; it is the active portion of binding medium and is the only scientifically controlled ingredient of concrete.

Portland cement referred as (Ordinary Portland Cement) is the most important type of cement and is a fine powder produced by grinding Portland cement clinker. The OPC is classified into three grades, namely 33 Grade, 43 Grade, 53 Grade depending upon the strength of 28 days. The cement as determined from various tests conforming to Indian Standard IS: 8112:1989. Cement was carefully stored to prevent deterioration in its properties due to contact with the moisture. The various tests conducted on cement are initial and final setting time, specific gravity, fineness and compressive strength.

3. COMPRESSIVE STRENGTH OF CONCRETE

The compressive strength of concrete is one of the most important and useful properties of concrete. Test specimens of size 150mm×150mm×150mm were prepared for testing the compressive strength concrete. The concrete mixes of varying percentages (0%, 0.7%, 0.8%, and 0.9%) of N100 chemical as partial replacement of cement were cast into cubes for subsequent testing. In this work, to make the concrete coarse aggregate of size 20mm, fine aggregates sand, Ordinary Portland cement (OPC), and N100 chemical were mixed properly with appropriate proportions for dry mix followed by addition of water and then mixed efficiently to achieve uniform and high workable mix. Before placing concrete in the mould the interior surface of the mould and the base plates were oiled with lubricant before the concrete has been placed than the concrete has been placed in 150 mm ×150 mm×150 mm cube. The concrete is filled in the mould. Each layer is tamped at least 25 strokes of the tamping rod. After 24 hours the specimens were removed from the mould and placed in clean fresh water at a temperature of 27 ± 2ºC. The specimen was cast were tested after 3, 7and 28 days of curing measured from the time specimen placed for curing. After that the uniform applied loading of 4KN is given to sample in compression testing machine (CTM). The load was applied axially without shock till the specimen was crushed. Results of the compressive strength test on concrete with and without varying proportions (0.7%, 0.8% and 0.9%) of N100 replacement at the age of 3days, 7 days and 28 days were noted.

The cubes were tested using compression testing machine (CTM).

P/A = Compressive stress.

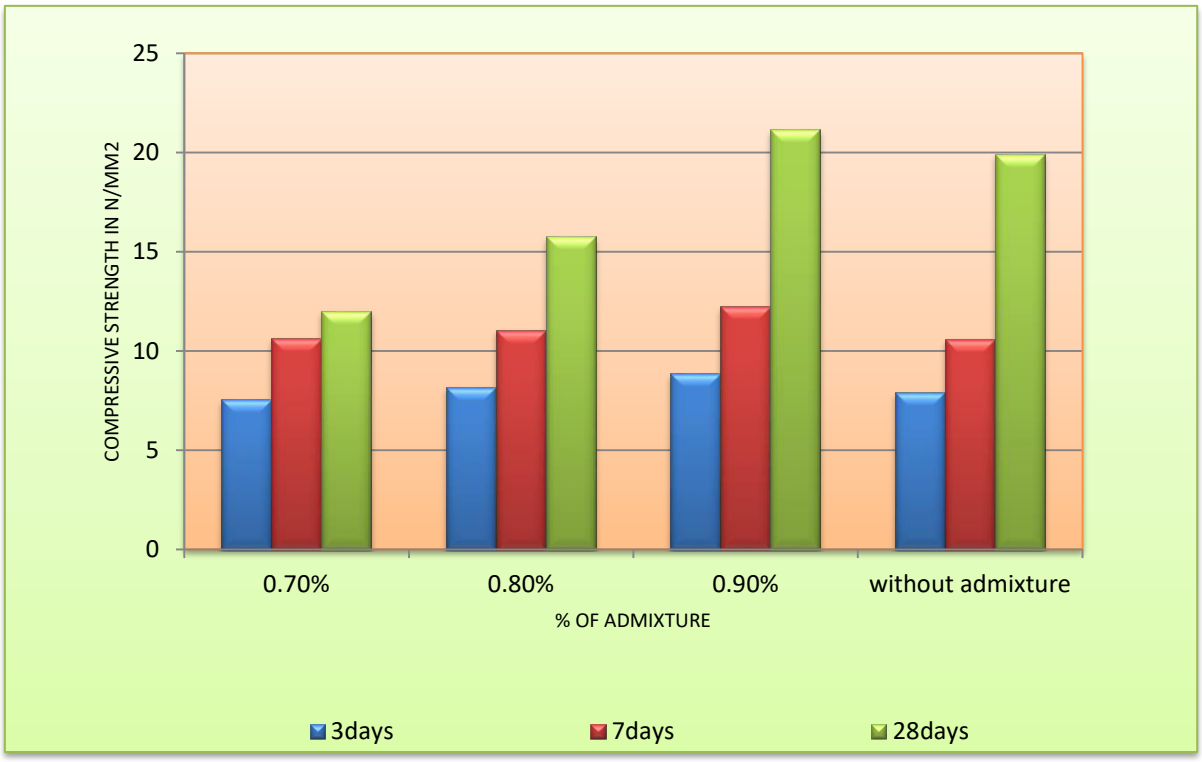
Where,

P = Load (N) and A = Area (mm2).

4. RESULTS

Test specimens of size 150 *150* 150 mm were prepared for testing the compressive strength concrete. The concrete mixes with varying percentages (0%, 0.7%, 0.8% and 0.9%) of N100 as partial replacement of cement were cast into cubes. 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. For testing in compression, no cushioning material was placed between the specimen and the plates of the machine. The load was applied axially without shock till the specimen was crushed. Results of the compressive strength test on concrete with varying proportions of N100 replacement at the age of 7, 14 and 28 days are given in the Table

	Admixture N100			
	0.70%	0.80%	0.90%	without admixture
3days	7.53	8.19	8.87	7.89
7days	10.62	11.062	12.25	10.59
28days	12.017	15.76	21.15	19.92



5. CONCLUSION

The strength and durability characteristics of concrete mixtures have been computed in the present work by replacing 0.7%, 0.8% and 0.9% N100 with the cement. On the basis of present study, following conclusions are drawn:

Compressive strength:

1. After adding 0.7% and 0.8% N100 in the mix, there is no increase in the strength of cube after 3days, 7 days and 28days as compared to concrete without replacement.
2. By adding 0.9% N100, there is large amount of increase in strength after 3, 7 and 28 days respectively.
3. Therefore add the admixture of 0.9% will help to increase in the compressive strength of concrete.

6. REFERENCE

[1].https://www.researchgate.net/publication/319483082_Study_of_Partial_Replacement_of_Cement_by_Silica_Fume.

[2]. Concrete technology **by** M.S. shetty.

[3]. IS 516-1959 Method of test for strength of concrete

[4]. Concrete technology **by** M L Gambir