

Experimental Study On Nano Silica Modified Concrete

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Abstract

The Property of regular cement can be improved by expansion of Nano silica. In this venture nano silica and were utilized with concrete composites to build the properties of cement. The goal of the current examination is to research the conduct of nano silica Modified concrete cement in both new and solidified state. The solid of M25 grade traditional cement is utilized and the nano silica from 0% to 2.5% were utilized. The outcomes acquired are the halfway expansion of nano silica with regular concrete cement up to 1.75% which upgrades the quality of Concrete

Keywords: Nano Silica modified cement concrete, Slump, Strength, GGBS

1. INTRODUCTION

The Major CO₂ - conveying zones, for instance, power age. Transportation, oil refining, and amassing of steel and concrete are resolved to reduce CO₂ worldwide outpouring rate by 2030. Nowadays, nano advancement has a noteworthy activity in improvement of adventures it is been seen that some of the properties of concrete were influenced by various materials of Nano As low calcium flyash based geopolymer concrete is a substitute alternative for concrete based items, nano materials may similarly have some effect on it. In order to reduce early mischief of platform deck black-top cement in cold regions, certain substance of included substances ought to be incorporated. The extra added substance should have a conventional interface between the paste and aggregate of the cemented solid, which may improve the quality and strength of the strong will diminish the early damages in structures. Properties of Materials.

2. MATERIALS

• Cement:

In the present exploratory assessments, Priya cement of 53 grade was used, certifying to IS 8112-1989 was used and the solid model was taken a lab for testing as per IS4031- 1988 and IS 269-1976.

• Fine Aggregate:

In the trial work, sand (M-sand) was used as FA, complete with a FM of 2.40 and sp. gravity of 2.687. FA under zone III as per IS 2386 (Part I, Part III), 1963.

• Coarse aggregate:

For the current work, locally accessible stone totals of size 20mm to 4.75mm were utilized the various tests were executed on the totals according to IS 2386-1988 section III

- **Nano Silica :**
Nano silica was from Peenya, Bangalore, was used in present work.
- **Water:**
Normal water was used for the present work and which is free from chloride.

3. METHODOLOGY

Present Project Focused on Fresh and Hardened concrete of cement with expansion of Nano silica to the solid is completed. From the test outcomes the solid blend configuration arranged according to IS 10262-2009 for solid evaluation blend M25. They are included independently into the customary cement by the measurements between 0 % to 2.5%. The new properties of concrete tested by slump test and Hardened Property by compressive quality of Acrylic altered concrete is to be computed at 7 and 28 days and contrasted with the ordinary cement.

Slump Test:

The slump cone test generally measures the consistency of the concrete before it sets. The test is popular due to the simplicity of apparatus used and simple procedure and also can be carried out in the site itself such that no separate Lab setup is required for conducting the experimental work.

Compressive Strength test:

The compressive strength is measured in Universal testing machine (UTM) with capacity of 3000kN. The compression strength is carried out on a specimen of the size 150x150x150mm of 27 cubes, 3 cubes for each of the mixes with different dosage of Nano Silica along with controlled concrete as 1 group having 3 cubes. The compressive strength of the cubes was tested at the age 28days.

4. Results And Discussion

From the experimental investigation the following results are obtained for concrete by addition of Nano silica to concrete. The fresh property determined using the slump test and result shows that for 1.75% nano silica shows maximum slump value. In addition the compressive strength and Split Tensile strength of concrete has determined for the addition of Nano silica.



Figure 1: Slump Test



Figure 2. Compressive Strength Test

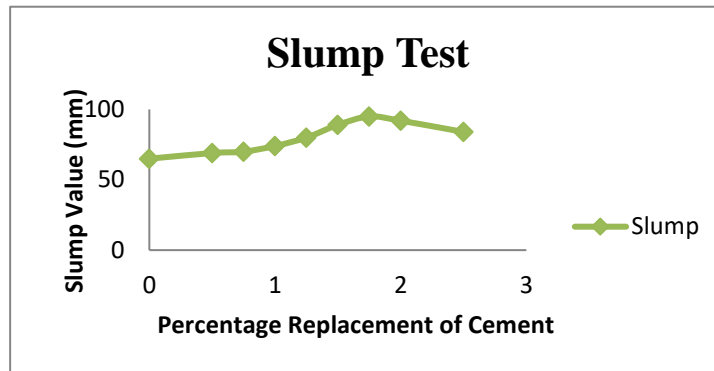


Figure 3. Slump Test

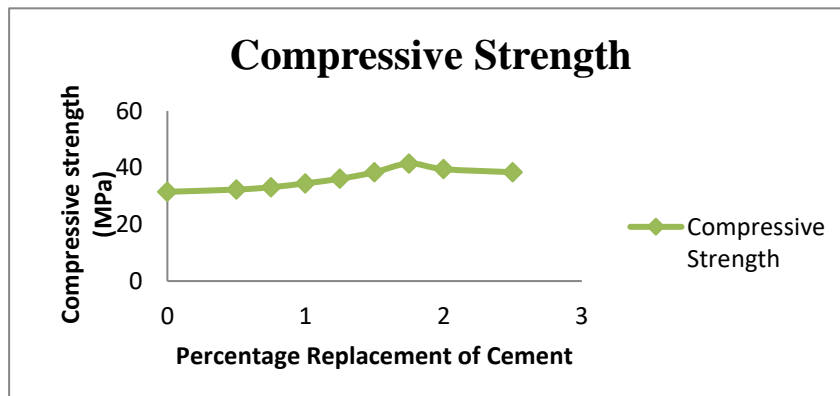


Figure 4. Compressive Strength

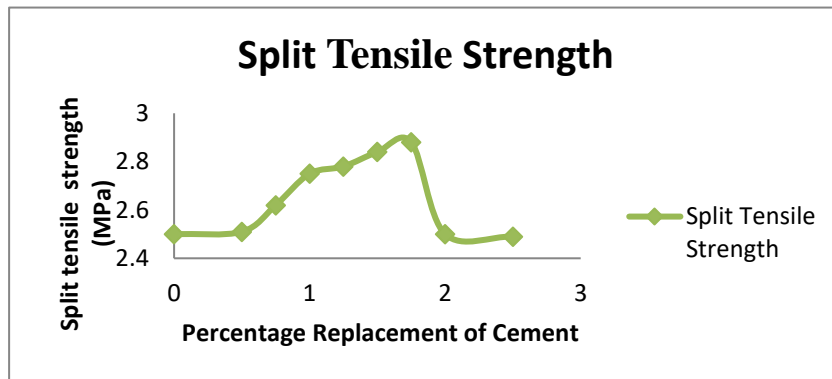


Figure 5. Split Tensile Strength

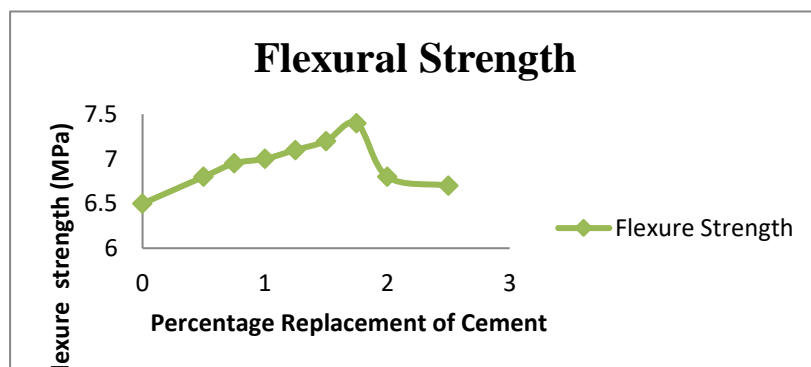


Figure 6. Flexural Strength

TABLE I: Test Results Details

S l n o	Grade of Concr ete	Replacement % of cement by Nano Silica	Slump (mm)	Compres sive strength (N/mm ²)	Split Tensile strengt h (N/mm ²)	Flexura l Strengt h (N/mm ²)
1	M25	0	65	31.5	2.5	6.5
2		0.5	69	32.3	2.51	6.8
3		0.75	70	33.1	2.62	6.95
4		1	74	34.5	2.75	7
5		1.25	80	36.1	2.78	7.1
6		1.5	89	38.4	2.84	7.2
7		1.75	95	41.5	2.88	7.4
8		2	92	39.5	2.5	6.8
9		2.5	84	38. 4	2. 4 9	6. 7

5. CONCLUSIONS

Based on the experimental test results, following conclusions were drawn:

- It is observed that, as increase in dosage of nano silica there is a increase in the slump up to 1.75% later the slump got decreases.
- It is observed that, as increase in dosage of nano silica there is a increase in the Compressive strength and Split tensile strength and Flexural strength to 1.75% later the strength got decreases.

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