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Performance on Special Concrete Using Steel Nail

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Abstract: ***Steel nails are essential in securing wood, timber, and building materials together and are used often in daily life. This essay investigates the potential instructions for utilising steel nails in composite concrete structures. To determine the compressive strength, samples are cast. Strengthening and flexural strength by incorporating steel nails into a physical matrix. Five distinct ratios were examined in this experiment. Various percentages of 3%, 6%, 9%, 12%, and 15% of steel nails were applied. The outcomes demonstrated that the steel nail's impact enhances the compressive and flexural strength of concrete substantially. The purpose of the study is to steel concrete nails.***
Keywords: Steel nails, Compressive strength, Split tensile strength.

I. INTRODUCTION

Steel nail concrete (SNC) is a type of concrete in which nails are dispersed at random. A nail is a discrete object that comes in a variety of sizes and forms. A more recent composite material, it has good flexural and compressive strength. It improves hardness, resistance to stress, and cracking in mortar caused by plastic shrinkage. These nails increase the structure's strength and lessen the need for reinforcement with heavy steel. Concrete's increased durability and thermal resistance to freezing and thawing lessen fracture width. The unexpected failure of typical concrete is caused by deflection. That result from the maximum flexural strength is exceeded while on a steel nail, concrete maintained its strength. Even the loads as a result of deflection. A number parameter describes the aspect ratio of the nail.

II. OBJECTIVES

1) Utilizing steel nails in various ratios, to evaluate the concrete's flexural and compressive strength.
2) Different percentages of steel nail concrete and regular concrete are compared.
3) To determine the ideal proportion of steel nails.

III. MATERIALS

A. Ordinary Portland Cement

The properties of cement are presented in Table 1 after evaluating in the laboratory.

Table 1. Properties of cement

Property	Cement (53 grade)
Specific gravity	3.15
Consistency	31%
Initial setting time	100 min
Final setting time	282 min
Fineness test	6%

B. Fine Aggregate

Natural sand is used as a fine aggregate and its properties are presented in table 2.

Table 2. Physical properties of fine aggregate

Property	Aggregate
Specific gravity	2.62
Water absorption	1.5 %
Fineness modulus	2 .4

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C. Coarse Aggregate

The physical properties of coarse aggregate are presented in table 3.

Table 3. Physical properties of the natural coarse aggregate

Property	Aggregate
Specific gravity	2.70
Water absorption	1.2%
Bulk density	1500 kg/m^3

D. Water

Potable water from the laboratory was used for mixing the concrete and also for curing the specimens.

E. Steel Nail

The section thickness is decreased in ordinary concrete when reinforcement is removed. Steel nails are quite expensive. Savings, a smaller amount of supplies, and quick building using less expensive labour. The distribution of concrete with steel nails assures that there are no micro cracks in the concrete at random.

IV. EXPERIMENTAL RESULTS

A. Compressive Strength Results

Concrete's compressive strength is evaluated following the curing process using a compression testing machine.

Table 4: Compressive strength of concrete reinforced with steel nail

S.No	% of steel nail	Compressive strength results, N/mm^2		
		28 days	56 days	90 days
1	0%	34.89	37.99	40.81
2	3%	37.57	40.94	43.57
3	6%	42.24	45.96	49.19
4	9%	44.61	48.59	52.09
5	12%	47.98	52.26	56.02
6	15%	45.62	49.62	53.27

V. CONCLUSIONS

1) The compressive strength of normal concrete at 28, 56 and 90 days is 34.89, 37.99 and 40.81 N/mm^2.

2) The compressive strength 12% of steel nail is 47.98, 52.26 and 56.02 N/mm^{2}at 28, 56 and 90 days.

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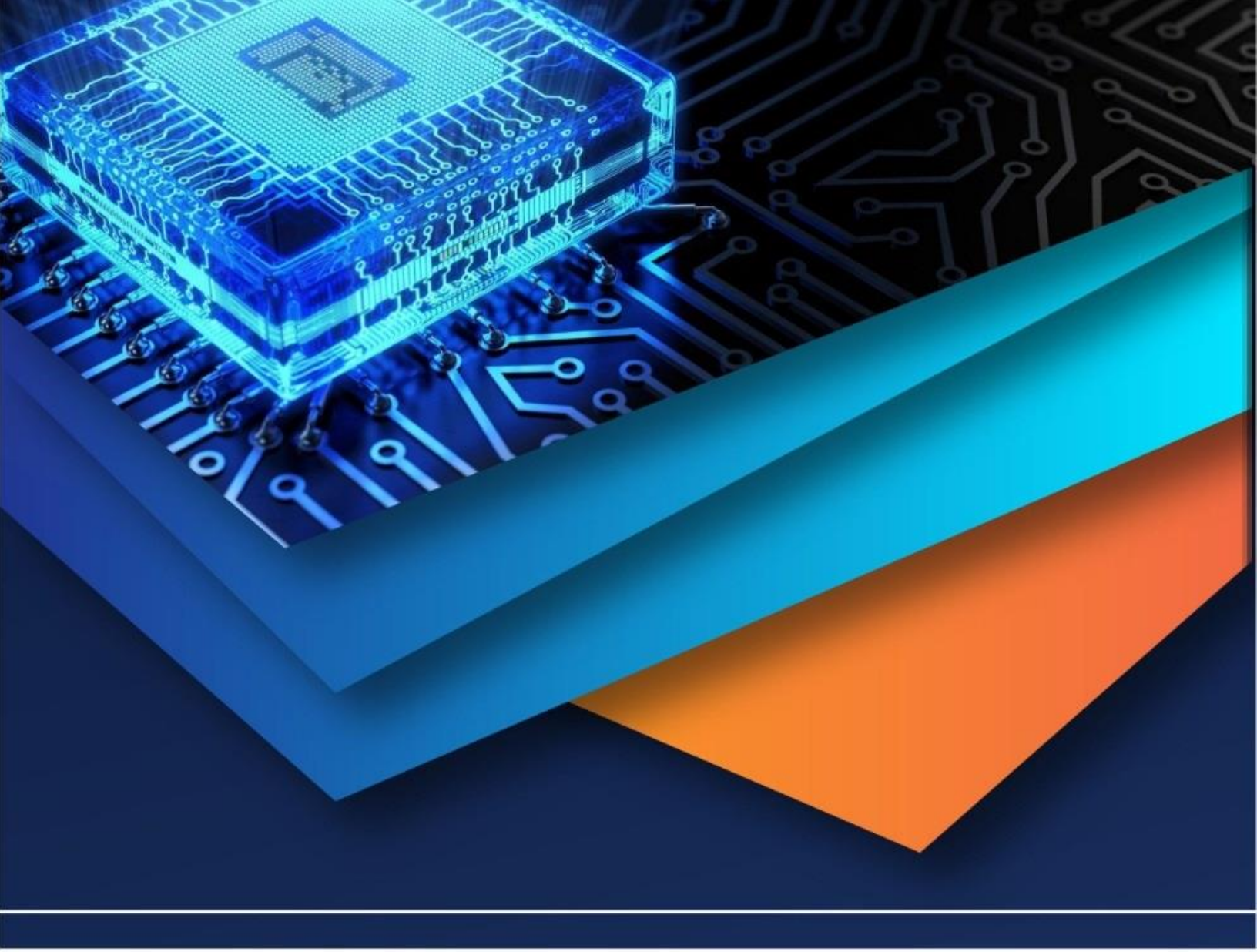
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