Comparative Study on Self-Curing Concrete Using Sodium Lignosulfonate and Light Weight Aggregate

E.Arundhava Priya, A.Gopalan, N.Mohanraj

***Abstract:** Concrete is the ancient material of construction. The relative volumes of concrete floor, coarse get worse, fine blend and standard water mixed along control the properties of concrete. Unnecessary evaporation of water out of fresh concrete should be eliminated, otherwise the level of cement hydrating would obtain lowered and thereby tangible may develop unsatisfactory properties. To enhance real property, curing of concrete is identified as providing satisfactory moisture, temp and time for to allow the real to achieve the sought after properties. It is also described as keeping the concrete in moist and enough so that the hydration of cement can certainly continueThis project aims to study the potency of concrete attained by self-curing method. Self-curing or water less curing is a type which can be used to hold the moisture in concrete for ideal hydration of cement and minimize the self-desiccation.Conventionally, curing of concrete means making conditions such that water is not lost from the specimen through the surface. Polyethylene Glycol, Paraffin Wax, Acrylic corrosive are a portion of the regularly accessible hydrophilic materials which is used in self curing. The experimental study is done by using sodium lignosulfonate as a self –curing agent and partially replacing coarse aggregate with light weight aggregate (waste granite).The devastating quality and split elasticity of self-restoring concrete with fluctuating rates (0.5%, 1%, 1.5%, 2%) of sodium lignosulfonate and 10% substitution of not substantial aggregate for 7, 14, 28 days is tried and contrasted and customary cement of comparative blend structure.*

***Keywords:** curing, self-curing concrete, compressive strength, sodium lignosulfonate, tensile strength, flexural strength*

I. INTRODUCTION

Curing is one of the stage in which the concrete is saved from moisture loss and kept within a reasonable temperature range. This procedure results in real with increased durability and diminished permeability. Curing is also a vital player with mitigating splits, which can significantly affect sturdiness. Curing of real can be defined as a good chemical method that assures the hydrating of concrete floor in recently placed concrete saw faq.

The curing procedure is section of the chemical response between Portland cement and water to hydrate the item, creating a solution that can be set down just in water-filled space. This usually requires the effects of moisture reduction and the temperatures affecting the hydration method.

Real must be located, ideally amongst 50 degrees and 75 degrees Fahrenheit, and this temp must be preserved during real curing. The methods of curing include external and internal curing.

II. EXPERIMENTAL STUDY

- To further improve in the effectiveness of this particular content of your concrete combine is by using sodium lignosulfonate and light weight aggregate
- To decide the qualities of self-relieving cement, for example, smashing, split pliable and flexural quality by including self-restoring operator in fluctuating rate and 10% of light weight total.
- The dimension of passing is inside the purposes of control as per May be: 383-1970

III. MATERIALS USED

A. Cement

Regular Portland concrete of class 43

B. Fine aggregate

Hereabouts available waterway sand.The level of passing is inside the points of confinement according to May be: 383-1970

C. Coarse aggregate

Smashed blue metallic was used because coarse combination. The rough aggregate as outlined by IS: 383-1970 was used. Optimum coarse mixture size utilized is 20mm.

D. Light weight aggregate

Waste granite was used as light weight aggregate. It was crushed to maximum of 20mm size and used as 10% replacement of coarse aggregate.

E. Water

Standard water utilized was crisp, dismal, scentless and dull, advantageous water that was free from causing early-age breaking natural matter of any kind.

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F. Sodium Lignosulfonate

Sodium lignosulfonate are fundamentally for solid blend as water-decreasing added substance.

Table. 1 Properties of Sodium lignosulfonate

S.No	Index Items	Standard Values
1.	Specific gravity	1.25
2.	Appearance	Yellow Brown
3.	Lignosulfonate	55%(min)
4.	Dry matter	95%(min)
5.	Water-insoluble	1.5%(max)
6.	Water Reducing Capacity	8% min
7.	Sulphate	2%-5%
8.	Calcium and magnesium	0.5% max
9.	Moisture	7% max

Table. 2 Mix Proportion

Cement (kg/m^3)	Fine aggregate (kg/m^3)	Coarse aggregate(kg/m^3)	Water (l/m^3)
426.67	650.88	1145.59	192
1	1.52	2.7	-

IV. TEST RESULTS

A. Compressive Strength

Table. 3 Compressive Strength Test on Concrete Cubes

Sodium lignosulfonate%	Average Compressive strength(N/mm^2)	
	7 days	28 days
0	21.4	36.58
0.5	28.44	38.73
1	26.2	32.47
1.5	26.36	30.43
2	18.87	30

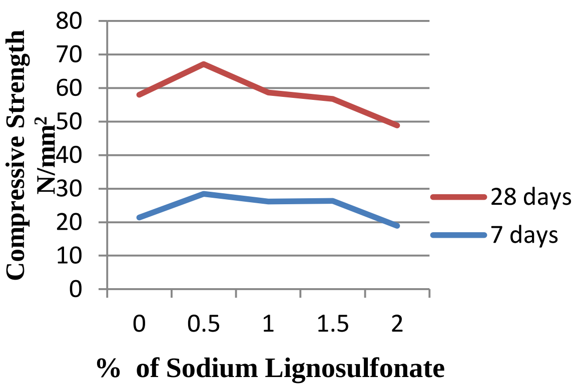

Fig. 1 Compressive Strength Test on Cubes

B. Split Tensile Strength

Table. 4 Tensile Strength Test on Concrete Cylinder

Sodium lignosulfonate %	Average Split Tensile strength(N/mm^2)	
	7 days	28 days
0	2.12	2.59
0.5	2.26	2.97
1	2.09	2.78
1.5	1.93	2.67
2	1.55	2.1

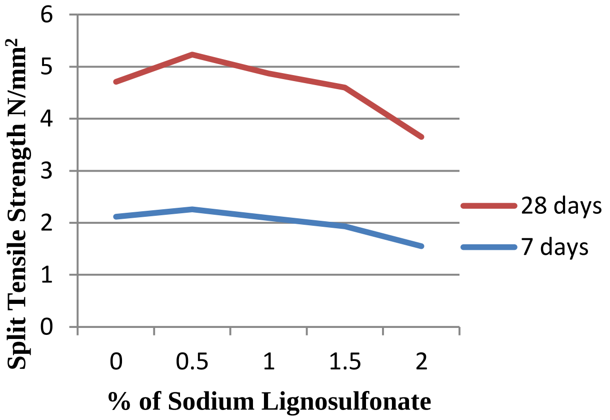

Fig. 2 Split Tensile Strength Test Cylinder

C. Flexural Strength

Table. 5 Flexural Strength Test on Concrete Prism

Sodium lignosulfonate%	Average Flexural strength (N/mm^2)	
	7 days	28 days
0	1.57	2.17
0.5	1.55	2.97
1	2.09	2.77
1.5	1.93	2.67
2	1.53	2.1

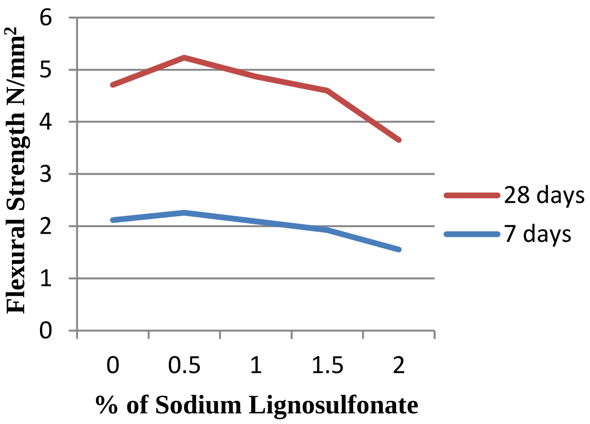

Fig. 3 Flexural Strength Test on Concrete Prism

V. RESULTS AND CONCLUSIONS

- An experimental work has been carried out on the specimens like cubes, cylinder and prism using sodium lignosulphonate as self-curing agent and partially replacing coarse aggregate with 10% of light weight aggregate.
- The self-relieving specialist sodium lignosulphonate was utilized at various rates with M25 grade solid blend dissected and contrasted and regular cement.
- The examination uncovers that the compressive quality of cement is observed to be expanded by 6% at 0.5% of sodium lignosulfonate for 7 and 28 days contrasted and traditional cement of same water-bond ratio(0.45)
- The rigidity of cement is observed to be expanded by 12% at 0.5% of sodium lignosulfonate for 7 and 28 days contrasted and customary cement of same water-concrete ratio(0.45)
- The rigidity of cement is observed to be expanded by 12% at 0.5% of sodium lignosulfonate for 7 and 28 days contrasted and customary cement of same water-concrete ratio(0.45)
- Contrasting with fluctuating rates of sodium lignosulfonate (0.5%, 1%, 1.5%, and 2%).The compressive, elastic and flexural quality test outcome demonstrates that the ideal quality of self-relieving concrete accomplished at 0.5% of sodium lignosulfonate when contrasted with ordinary cement.
- Hence this test examine demonstrates that the utilization of sodium lignosulfonate as self-relieving operator is conceivable. It decreases the setting issues in sweltering climate cementing by improving the usefulness and water maintenance and enables functionality to be expanded without including additional water the compressive, malleable and flexural quality test outcome demonstrates that the ideal quality of self-relieving concrete achieved at 0.5% of sodium lignosulfonate when contrasted with traditional cement.

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