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An Experimentally Research For Graphite as A Cement into the Concrete

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Abstract - *Now a days, the Construction technologies and Construction Industries as developed so much. Inspite of people searching for a Sustainable building and also durability wise, they are expecting lot. In this scenario, we have to give a modern construction material. That material is nothing but "Graphite". Why we are choosing this topic, because graphite has a very good Chemical composition and additively increase the strengthening property. It is a good Adhesive property. So it can be replaced by cement into the concrete. It is high thermal and electrical resistivity. Acid and Sulphate attacks can be easily resisted. Graphite having three familiar layers. Each layer has been very strong. Covalent bond is plays an important role of graphite. Diamond also a Covalent bond. We hope that, in Future it called as "Materials of Future".*

Key Words: Graphite, Covalent Bond, Materials of Future, Sustainable Material, Durability material

1. INTRODUCTION

Graphite is normally occurs in metamorphic rocks and sometimes in igneous rocks. Graphite is always available in crystalline formation. In India Mumbai is a main supplier of graphite throughout our country. Graphite has some unique properties will be there. Graphite having three familiar layers. Pickup one layer is called as Graphene. The graphene is normally strong bond. But difficult to split into the graphite. Graphite is normally preferred from thermo chemistry labs, because it is highly resist to heat. Compare to the steel, it is in high thermal resistance. Steel withstand 2000 degree Celsius. But graphite withstands above 3500 degree Celsius. Graphite is high tensile strength and also high compressive strength. The carbon and hydrogen as very strong bong connection. One of the main drawback is connection of three layer graphene is a weak bond. That weak bond may reduce the strength also. So graphite can be preferred form nonstructural bearings. Hopefully graphite is in Environmental friendly and purified to the surrounding air.

2. MATERIAL PROPERTIES AND TESTS:

In our study we have to fully replacement of Graphite for cement.

2.1. Material Properties:

2.1.1. Graphite:

Graphite is otherwise called as Plumbago. It is naturally in crystalline form. It is a type of mineral. Graphite used in lubricant factories. Because it is lustrous property. It is look like a slippery view.

Fig 1 Graphite

The chemical composition is carbon and hydrogen together to make the bond. The bond having three layers.The Strong bond is otherwise called as Covalent bond and the weak bond is called as van der Waals bond.

Graphite is a planar Structure. The layer has been honeycomb shape. The Fourth electron which migrates the plane. Graphite is electrically conducted. It does not conduct right angle to the plane.

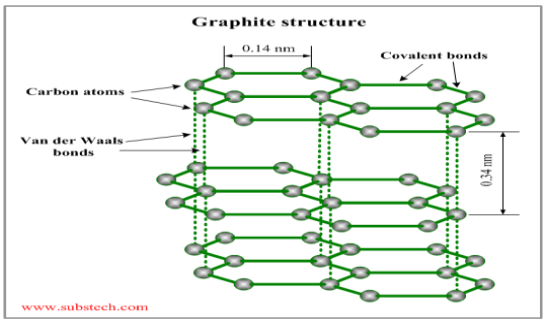

Fig 2

The two forms of graphite are Alpha and Beta. The Alpha is in hexagonal represent and the beta is rhombohedra represent. The alpha graphite may be flat or buckled. The alpha converts to beta by mechanical treatment. The beta reverts the alpha by heating upto 1300 degree Celsius.

2.1.2. Graphene:

A form of carbon consisting of planar sheet which are one atom thick , with the atoms arranged in a honey comb-shaped lattice.

It is the strongest material ever tested. Efficiently conducts heat and electricity and its nearly transparent. The theory said to be 200 times stronger than steel.

It improving the quality of the surrounding air. There is a potential to improve the appearance and environmental performance. Adding graphene to a concrete mix could increase the substance's strength.

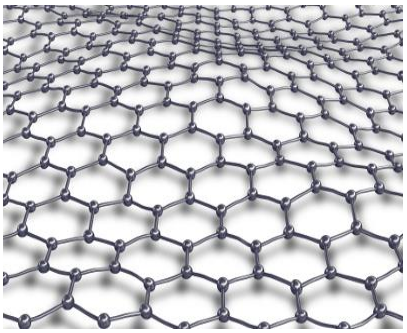

Fig 3

2.2. Laboratory tests:

If we conducted the laboratory test for graphite are following,

- Specific Gravity
- Fineness Test
- Workability test
- Compression cube test
- Split tensile test

2.2.1. Specific Gravity test:

In Specific gravity test has conducted by graphite. Finally got a result of Specific gravity value are 3.63 by using Density bottle apparatus.

2.2.2. Fineness test:

The Fineness test which is to be tested by IS Sieve 90 micron. The fineness percentage of graphite is 2.35% respectively.

2.2.3. Workability test:

The workability test has done by Slump Cone apparatus. We conducted three and more trials; the average value of workability is 73mm respectively.

2.2.4. Compression Cube test:

The compression test is normally high in the graphite. Compare to the Conventional concrete it attains early strength. In M30 grade of concrete 7 days strength is attained above 30 N/mm2. It is one of the high strength concrete without using of admixture.

Compression test (Conventional vs Graphite)

Days	Conventional Concrete	Graphite Concrete
7 days	19.03	32.66
14 days	25.98	54.74
28 days	31.13	83.02

2.2.5. Split tensile Test:

Split tensile basically very high in Graphite concrete. Because covalent bond is in high flexural strength. This covalent bond structure not easily to break down. It withstand 130.5 GPa is to be achieved. The Graphite tensile is more than that Steel reinforcement. It can be surely preferred from all the structural elements.

Split tensile test (Conventional vs Graphite)

Days	Conventional Concrete	Graphite Concrete
7 days	1.17	32
14 days	2.04	45
28 days	2.54	78

3. CONCLUSION

- Graphite improves the mechanical properties of the concrete.
- And we hope it creates the huge revolution in future.
- It has more unique properties.
- So far, we used in moderate performance materials in our construction. Instead of, it gives only less durability.
- I am assuring to prefer graphite concrete. Definitely it gives more durability.

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