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To Improve Compressive Strength Of Concrete Using Recron Fiber (Polyester Fiber)

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Abstract : **This paper describes the results of a study carried out for investigating the structural behavior of fibre reinforced concrete is of high strength compared to normal concrete and also reduces the cracks due to shrinkage. In this Project, Recron fiber is added to concrete in the proportion of 0%, 3%, 4%, and 5% by the weight of cement(Grade 53). This investigation is done in 2 different grades of concrete such as M20 and M25. For strength parameters, each grade of concrete for each proportion, cubes of 15cm * 15cm * 15cm are casted for 7 days, 14 days and 28. The compressive strength is found and compared.**

I. INTRODUCTION

Fibers include glass fibers, Steel fibers, natural fibers and synthetic fibers. Within these different fibers that characteristics of fiber reinforced concrete changes with vary concretes, fiber materials , geometries ,distribution, orientation and densities." Its properties would obviously, depend upon the well organized transfer of stress between mixture and the fibres, which is largely dependent on the types of fibres, fibre orientation, geometry of fibres, compaction and mixing techniques and size of aggregate. Our main aim is to increase the strength of the concrete by adding recron fibre to it.

Plain concrete is good in compression but weak in tensile strength with limited ductility and little resistance to cracking. In case of rigid pavements cracks are formed due to the variation in shrinkage, temperature and heavy live loads. This type of concrete is known as "Fiber reinforced Concrete ." In these thesis an attempt will be made to view the behavior of concrete mixed with RECRON 3s FIBER in comparison with plain concrete.

II. LITERATURE REVIEW

1) Experimental Study on behaviour of Recron "3s" fibre.
2) Effect of Different Percentages of Polypropylene Fibre (Recron 3s) on the Compressive, Tensile and Flexural Strength of Concrete.
3) Effect of Addition of Recron 3s Fiber And Glass Fiber on the strength Characteristics of M25 and M30 Concrete.
4) Experimental Investigation on Concrete using Recron Fibre as Reinforcement.
5) Experimental Study on behaviour of Recron Fibre Reinforced Concrete.
6) A Comparative Study of polypropylene, Recron and Steel Fiber reinforced Engineered Cementitious Composites.
7) Study of strength of polypropylene Fiber Reinforced Concrete.
8) Use of Recron Fiber to improve the Mechanical Properties of concrete.

III. CHARACTERISTICS OF FIBER REINFORCED CONCRETE

1. Improved durability and protection
2. Reduction of water in the mix
3. Reducers of mid-range water
4. Super plasticizers for reducers of High range water
5. Protection from corrosion

IV. SCOPE OF PROJECT:

The effects of recron fibers reinforced concrete mixes and others factors such as water to cement i.e. W/C ratio, type of fiber, volume, aspect ratio and its effect on strength has now been well established and much research has been carried upto date. The improvement of strength of recron reinforced concrete is lead by a relatively greater increase in impact resistance value.

V. EFFECTS OF FIBER REINFORCED CONCRETE

Fibers are usually used in concrete to control shrinkage cracking. They too lower the permeability of concrete and thus reduce the bleeding of water. Some types of Fibers produce greater impact, abrasion and shatter resistance in concrete. Generally these fiber increases flexural Strength and Compressive Strength of Concrete, so it cannot replace structural steel Reinforcement.

VI. TYPES OF FIBRE REINFORCED CONCRETE:

1. Steel Fiber Reinforced Concrete
2. Polypropylene Fiber Reinforced (PFR).
3. GFRC Glass Fiber Reinforced Concrete
4. Asbestos Fibers
5. Carbon Fibers
6. Organic Fibers
7. Recron Fibers

VII. METHODOLOGY :

VI.1 Mixing:

1. Mechanical Mixing.
2. Hand Mixing.

VI.2 Testing:

1. Determination of properties of material and concrete.
2. Casting of test samples
3. Carrying out various tests for project work.
4. Conclusion based on result of testing.

VIII. MATERIALS REQUIRED:

1. Fine Aggregate.
2. Coarse Aggregate.
3. Cement (53 Grade).
4. Recron Fiber.
5. Water.

IX. TESTS TO PERFORM:

Test on Cement:

Initial and Final Setting Time: The initial setting time is observed as the time pass among the moment that the water is added to the cement and that time the paste starts loosing its plasticity. The final setting time is the time elapsed between the moment that the water is poured to the cement and at the time when the paste has totally lost its plasticity and has achieved adequate firmness to resist certain definite pressure. It is essential that cement set neither too fast nor too slowly. The initial setting time should not be too long which causes insufficient time to transportation and place the concrete before it becomes too rigid. Also, the final setting time must not be too high which tends to slow down the concrete work and also it force postpone the actual use of the structure because of insufficient strength at the anticipated age.

Slump cone test :

Slump cone test is used to measure the workability of concrete. The device used for doing slump test are Slump cone and Tamping rod. This is the utmost commonly used test of measuring the consistency of concrete. It is not a appropriate method for very wet or very dry concrete. It does not measure all aspects contributing neither workability, nor it is always representative of the place ability of the concrete. Though, it is used suitably as a control test and gives an indication of the consistency of concrete from batch to batch. It is performed with the help of a container shaped in form of a frustum of a cone opened at both ends. Reading must be noted down properly.

Compressive strength test:

For cube test of specimen's cube of 150mm * 150mm * 150mm are used. For most of the works cubical molds of size 15 cm x 15cm x 15 cm are generally used. This concrete is filled in the moulds and tamped 25 Blows properly so as not to have any voids. After 24 hours these moulds are removed and test specimens are put in water for curing. The top surface of these specimen should be made even and smooth. This is done by putting cement paste and spreading smoothly on whole area of specimen. These specimens are tested by compression testing machine after 7 days curing or 28 days curing. Load should be applied gradually at the rate of 140 kg/cm2 per minute till the Specimens fails. Load at the failure divided by area of specimen gives the compressive strength of concrete.

X. PHOTOS:

- MATERAIL AND MIXING:

- CASTING:

XI. CONCLUSION:

An experimental study was conducted on cubes, cylinders, beam, for compressive, split tensile strength, flexural test respectively by mixing various percentages of recron fiber. Based on the investigation the following conclusions were drawn. They are:

- The Compressive Strength of Reinforced Concrete was less than Recron Fiber Reinforced Concrete at all percentage of mix.
- The flexural strength of reinforced concrete was less than recron fiber reinforced concrete at all percentage of mix.

Hence, Recron Fiber has greater strength in Compression and Flexure.

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