Mechanical Properties of Concrete by The Addition of Asbestos and Recron 3s Fibre

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Abstract*— The focus of nations is on cost-effective, environmentally friendly technologies that may be applied to improve the way concrete is used. Shear strength, tensile strength, and brittleness are among the lowest of the most commonly used building materials, concrete. A new type of construction material known as asbestos fiber concrete and recyclon 3s fiber concrete was created via research and development efforts to enhance these qualities. Concrete of M30 grade was used to cast the mixture in the appropriate quantities. Compressive strength, split tensile strength, and flexural strength tests were conducted on M30 grade hardened concrete using different percentages of Recron 3S fiber (i.e., 0%, 0.25%, 0.50%, and 0.75%) in relation to the cement weight after 28 days. The test outcomes were compared. Governments are concentrating on cost-effective sustainable technology that may be implemented to improve the use of concrete. The most used building material is concrete, which has extremely low shear and tensile strengths as well as brittle qualities. Through research and development, two new building materials, asbestos fiber concrete and recyclon 3s fiber concrete, were created in order to enhance these qualities.

***Index Terms*— Asbestos fiber concrete, Recron 3s fiber concrete,Tensile strength and compressive strength**

I. INTRODUCTION

Concrete is the most widely used, reasonably priced, and adaptable building material. It became well-liked as a fundamental building material in construction because of its affordability, high compressive strength, good durability, ease of manufacturing, and capacity to be molded into the necessary shape and size.

To look into how Recron 3S affects the flexural and tensile strength of concrete. examining the effect of Recron3's fibers on the compressive strength of concrete. Find the best possible dosage of Recron 3S fibers to utilize in concrete.

The main cause of civil structural failure is steel corroding with salt, which causes steel to deteriorate. Maintaining and repairing these civilian constructions is necessary to extend their lifespan. In order to mitigate the risk of failure in steel-reinforced concrete structures, the subsequent methodology is commonly employed. The polymer fiber compounds are adhered to the framework using this method.

The compressive, split tensile, and flexural strengths of normal and Recron3S Fiber-reinforced concrete were determined by experimentation. The results are totaled, examined, and their effectiveness is examined.

It has long been standard practice to add fibers to composite materials in order to improve their mechanical qualities. Our goal in this experiment is to find out how asbestos and Recron 3S fiber affect a composite material's mechanical characteristics. Asbestos is a naturally occurring mineral fiber; Recron 3S is a synthetic fiber. Since both fibers have distinct qualities, they have been utilized historically to reinforce things.

Fibers are added to concrete in order to manage and prevent cracks, as well as to restore the energy absorption capacity and post-cracking response.. The Greek word that means "inextinguishable, unquenchable, or inconsumable" is where the word asbestos originates. All that the crude mineral is a fragment of rock. Being both fibrous and crystalline, elastic and brittle, and able to be carded and transformed into a form that may be spun and woven like wool, flax, or silk has led some to refer to it as a physical paradox.. Even the most intense heat cannot destroy.

Coconut, sisal, jute, cotton, asbestos, metallic, and glass fibers are a few of the materials that are most frequently used. Artificial Fibers There are various kinds of synthetic fibers, such as glass, asbestos, nylon, plastic, and polypropylene. This selection's great strength and resistance give it a natural cord. According

to Setty and Rao (1987), polypropylene fiber is resistant to chemicals, alkali, and acids.These fibers have a high melting point (1650C), are robust, and are resistant to seawater. UV light from the sun can naturally harm polyimide, however as long as the fiber is absorbed, it is unaffected. No chemical alterations were discovered for the fiber experience. Additionally, synthetic fibers are quite resistant to the environment. Fibers made of polypropylene are vulnerable to fire and direct sunlight.

II. MATERIALS AND METHODOLOGY

Content and Procedures According to IS: 8112-1989, regular Portland cement of grade 43 is utilized. As coarse aggregate, crushed granite metal (graded) with 20 mm to 60% and 10 mm to 40% is utilized; the material is evaluated in accordance with IS: 2386-1963. River sand is utilized as fine aggregate in accordance with IS: 383-1970, which confirms zone II. Fiber Recron 3s is utilized. Reliance Technology Center for the Asbestos Cement Industry introduced it. Admixture used is SP 430.

The process of choosing the right concrete materials and figuring out their maximum proportion to produce, as cheaply as feasible, concrete that meets the required workability and compressive strength is known as the concrete mix project. The IS 10262 (2009) is followed in the mix design process. The concrete mix must be adjusted for a higher target mean compressive strength so that no more than the designated percentage of test results are anticipated to fall below the characteristic strength.

The mixture ratios used for concrete of M30 grade With a water to cement ratio of 0.45 and a cement content of 380 kg/m³, the selected mix proportion is 1:0.75:1.5. For the M30 grade of concrete, for example, 0.1%, 0.2%, 0.3%, and 0.4% addition of modified Recron 3s fiber are used, for a total of 4mixes per grade.

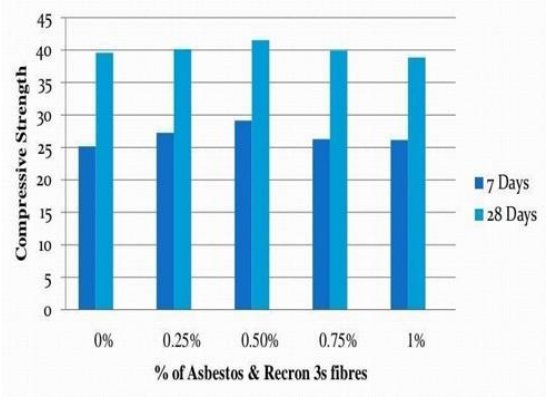
Because of its insulating and heat-resistant qualities, asbestos is a naturally occurring mineral that has been used in a variety of industries. But since asbestos is now acknowledged to present major health hazards, its use is strictly regulated or outlawed in many nations.

III. RESULTS AND DISCUSSION

Table 1 Compressive strength of cubes for7 & 28 days

S.NO	Fibre percentage	7days compressive strength (N/mm2)	28 Days compressive strength (N/mm2)
1	0%	25.17	39.58
2	0.2%	27.25	40.13
3	0.5%	29.13	41.53
4	0.75%	26.28	39.93
5	1%	26.15	38.85

Graph 1 Graphical representation of compressive strength test results



CONCLUSION

- From the results, it was found that the fibres of optimum strength were 0.5% in compressive strength and spilt tensile strength. 0.5% in the flexural strength test.
- The best combination to meet the required amount of fiber is to use 0.5% of it.
- Fibers are used to reduce microcracks, permeability, and maintenance cracks, which increases durability.
- It has been demonstrated that using Recron3s fibers lessens segregation. Comparing the

compressive strength to regular concrete, there is a 7.66% increase.

- The split tensile strength of fibres was increased at 0.5%.
- Comparing split tensile strength to regular concrete, there is a 25.29% gain.
- The flexural strength of fibres were increased at 0.5%.
- Flexural strength increased by 24.01% compared to conventional concrete.
- In this research, the combination of glass fibers and fiber-3S with concrete strength is investigated.
- The conclusion reached was that, in comparison to 3S-Fiber, mixing glass is more costly and requires more time.
- In 28 days, glass fiber's flexural strength surpasses that of recron 3S fiber. The application of medium and high glass layers lengthens the softening branch and smoothes out the steep slope, significantly enhancing post-peak thermal performance to suit flexibility.
- Increasing the fiber content keeps the softening branch intact and enhances post-peak performance. This essay demonstrates the outcomes of GCBS by substituting different fiber replacements for cement and explains the composition of various glass types.
- However, for both M40 and M45, the highest split tensile strength of Recron 3sfiber reinforced concrete is achieved when the fiber content reaches 0.25% after 28 days of curing.Recron 3S fibers were put to concrete, however no significant modifications in the material's physical characteristics were noticed.
- However, for both M40 and M45, the highest compressive strength of Recron 3s fiber reinforced concrete is achieved when the fiber content reaches 0.25% after 28 days of cure.

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