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Review on Study of Flexural Behaviour of Coconut Fibre Concrete

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ABSTRACT: Sustainability is a wide accepted concept in modern construction scenario. Even though the construction industry is revolutionising in a significant manner in terms of both equipment and materials used, the cost of construction has skyrocketed along with the deteriorative impact on environment. This resulted in the adoption of a more balanced approach with the environment as its nerve centre to create a better world to live in. This has led to the adoption of a natural fibre like Coconut for the strength enhancement in concrete.

KEYWORDS: Compressive strength, Tensile strength, Flexural strength, CFRC, Fibre mesh

I. Introduction

The construction industry is revolutionising in two major ways. One way is the development of construction techniques, such as using automated tools in construction. The other is the advancement in high-performance construction materials, such as the introduction of high strength concrete. Among these high-performance materials, fibre reinforced concrete (FRC) is gradually gaining acceptance from civil engineers. In recent years, research and development of fibres and matrix materials and fabrication process related to construction industry have grown rapidly. Their advantages over other construction materials are their high tensile strength to weight ratio, ability to moulded into various shapes and potential resistance to environmental conditions, resulting in potentially limited maintenance cost. These properties make FRC composite a suitable alternative for innovative construction. Their application in construction includes both upgrading existing structures and building new ones, which can apply to several types of structure, for example offshore platforms, buildings, and bridges.

II. REVIEW METHODOLOGY

The aim of this study is to investigate the effect of oil coated coir fibre on physical properties of concrete The aims of this work are:
To find out variation in compressive, tensile, and flexural strengths of CFRC using processed fibre strands and raw fibre meshes at varying fibre contents and to compare it with that of conventional concrete
To decide the influence of shape of fibres on strength of concrete The scope of this project is limited o rural residential constructions.

III.LITERATURE REVIEW

Among the high-performance materials, fibre reinforced concrete (FRC) is gradually gaining acceptance from civil engineers. In recent years, research and development of fibres and matrix materials and fabrication process related to construction industry have grown rapidly.
Their advantages over other construction materials are their high tensile strength to weight ratio, ability to moulded into various shapes and potential resistance to environmental conditions, resulting in potentially limited maintenance cost. These properties make FRC composite a suitable alternative for innovative construction. Their application in construction includes both upgrading existing structures and building new ones, which can apply to various types of structure, for example offshore platforms, buildings, and bridges (Thou, 2005)

(Bhatia, 2001) studied the usefulness of fibre reinforced concrete in various civil engineering applications. Fibres include steel fibre, natural fibres, and synthetic fibres each of which lends varying properties to the concrete. The study revealed that the fibrous material increases the structural integrity. These studies made us adopt natural fibres which are abundantly available and cheap.

IV. STUDY OF MAYER USED

OVERVIEW

Concrete is a freshly mixed material which can moulded in any shape. Concrete is a site made material unlike other material of construction such as can vary to a very great extent in its quality, properties and performance owing to the use of natural material except cement.
The properties of materials are important to make concrete workable and durable.

FINE AGGREGATE

Aggregates are the important constituents in concrete. They give body to the concrete, reduce shrinkage and effect economy. They occupy about 70-80 percent of the volume of the concrete. Aggregates shall consist of naturally occurring (crushed or uncrushed) stones, gravel and sand or combination thereof. They shall be hard, strong, durable, clear, and free from veins and adherent coating, and free from injurious amounts of disintegrated pieces, alkali, vegetable matter and other harmful substances. As far as possible, flaky, and elongated pieces should avoid.
Aggregates can classify into fine aggregates and coarse aggregates.

COARSE AGGRFGATE

IS 383-1970 defines coarse aggregates as Aggregates most of which kept on 4.75 mm IS Sieve and having only so much finer material as is allow for the several types described in this standardFigure4.2 Coarse aggregates may define:
1. Uncrushed gravel or stone which results from natural disintegration of rock,
2. Crushed gravel or stone when it results from crushing of gravel or hard stone,
3. Partially crushed gravel or stone when it is a product of the blending of uncrushed gravel stone and crushed gravel or stone.

WATER

According to IS 456: 2000, water used for mixing and curing shall be clean and free from injurious amounts of oils, acids, alkalis, salts, sugar, organic materials, or other substances that may be harmful to concrete or steel. Potable water considers satisfactory for mixing concrete. The pH value of water shall be not less than 6

COCONUT FIBRE

Coconut fibre both raw and processed used in this research.

RAW FIBRE

It is the waste material obtained from mattress manufacturing and have high degree of tensile strength of 21.5 Figure 4.3. They wash before use. This will remove dust and other residual particles left on the fibre to augment the surface of contact between the fibre and mix resulting in better binding between the reinforcement and concrete and higher strength. The fibres then cut into square meshes of size 5cm x 5cm

PROCESSED FIBRES

They wash and draw into strands before use. Treatment of fibres removes dust and other residual particles left on the fibre to augment the surface of contact between
the fibre and mix resulting in better binding between the reinforcement and concrete and higher strength. The fibre wash in tap water for 30 minutes to loosen the fibres and to remove the coir dust. Fibres are wash and soaked again for 30 minutes. This process is to repeat three times The softened fibres straightened manually and 13combed with a steel comb. Figure 4.4. To accelerate the drying process, the wet long fibres will put in oven at 30°C for 10–12 in which most of the moisture will removed.The fibres are completely dry in the open air, combed again and finally cut into the required length of 5cm and soaked in oil for 15-20 min and dried in sun for 24 hours

V. CONCLUSION

The study on the flexural behaviour of coconut fibre reinforced concrete (CFRC) shows that the inclusion of coconut fibres significantly improves the flexural strength and crack resistance of concrete. The natural fibres act as effective bridging materials, delaying the propagation of cracks and enhancing ductility.

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