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# Strengthing of RC Member Using Corbon Fiber Sheet

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***Abstract:*** *The main aim of this project is to increase the awareness of the use of Textile fibres as construction materials in the construction industry which is an innovative technique for improving the shear response of reinforced concrete member. The method of strengthening concrete structures with carbon textile fibre-reinforced sheet (CTFS) composites has encountered rapid growth in recent years. The most common way to strengthen structures is in Flexure. However, there is also a need for strengthening in shear. Therefore, an experiment is to be conducted to find out the effects of CTFS and its behaviour, ultimate strength of shear deficient (without stirrups) reinforced concrete (RC) beams which helps to investigate the gain in shear strength of beams using internal stirrups.*

*It's the most effective way to use material such as carbon textile-reinforced mortar as an innovative technique of enhancing the shear response of reinforced concrete beams has been investigated. This experimentation also comprises the comparative statement of properties of carbon textile fibre sheet as reinforced concrete with conventional concrete based on experiments performed in the laboratory. The research also includes the testing of large-scale beam for the shear response of reinforced concrete beams strengthened with textile-reinforced mortar and compared with the same sized conventional beams.*

***Keywords:*** *Carbon Textile Fibers sheets, M35 Concrete, Shear strength, c*

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## I. INTODUCTION

The application of carbon textile fiber sheet (CTFS) as a means of increasing the shear resistance of reinforced concrete members is investigated in this study. carbon textile fiber sheet (CTFS) is been considered as an alternative method, providing solutions to many of the problems associated with application of the latter without compromising much the performance of strengthened members. According to the experimental response of conventional and reinforced concrete members strengthened in shear. Textile-mortar jacketing provided substantial gain in shear strength; the shear strength increases as the number of layers increases and, depending on the number of layers, is sufficient to transform shear-type failure to flexural failure.

**Aim:**

The project aims to investigate shear response of RC component (beam) strengthened in shear with CTFS and through the conclusions provide recommendations on the field.

**Objectives :-**

The overall objective of the current study is to investigate the shear response of RC beams strengthened in shear with CTFS. The detailed objectives are listed herein:

- To study the physical properties of CTFSs by conducting durability tests on M35 Grade CTFS concrete cubes
- Examine the viability of using CTFS strengthening system to improve the shear response of RC beams
- Demonstrate the application of CTFS for the strengthening of existing RC structures.

## II. RELATED WORK

1. **Josef Hegger, Alaa Sherif, and Stephan Gortz (2004)** [2] - Investigation of Pre- and Postcracking Shear Behavior of Prestressed Concrete Beams Using Innovative Measuring Techniques-Till date no theory is in existence which can fully describe the complex behaviour of reinforced concrete elements subjected to shear. On the contrary, one may find recent research results contradict each other. Using innovative measuring techniques, the pre- and post-cracking shear behavior of concrete beams is studied giving insight to the shear resistance mechanism of reinforced concrete beams. To study the precracking behavior, the method of laser-interferometry is applied. Before the formation of visible cracks nonlinear stress distributions take place,

thereby influencing the cracking angle. The photogrammetry is applied to study the post cracking behaviour. The displacement components of the crack edges are used to estimate the shear transferred across the cracks by shear friction. The beams with low or high shear reinforcement ratios, the amount of shear force transferred across cracks by shear friction is negligible.

**2. Zoi C. Tetta, Lampros N. Koutas, Dionysios A. Bournas (2015)** [3] -Textile-reinforced mortar (CTFS) versus fiber-reinforced polymers (FRP) in shear strengthening of concrete beams- This paper presents an experimental study on shear strengthening of rectangular reinforced concrete (RC) beams with advanced composite materials. The study include the following points: (a) the strengthening system, namely textile-reinforced mortar (CTFS) jacketing and fiber-reinforced polymer (FRP) jacketing, (b) the strengthening configuration, namely side-bonding, U-wrapping and full wrapping, and (c) the number of the strengthening layers. In total, 14 RC beams were casted and tested under bending loading. One of the beams did not receive any strengthening and served as control beam, eight received CTFS jacketing, whereas the rest five received FRP jacketing. It is concluded that the CTFS is generally less effective than FRP in increasing the shear capacity of concrete, however the effectiveness depends on both the strengthening configuration and the number of layers. U-wrapping strengthening configuration is much more effective than side-bonding in case of CTFS jackets and the effectiveness of CTFS jackets increases considerably with increasing the number of layers.

## III. METHODOLOGY

This project aims to study the physical properties of textile fibre sheets covered concrete by conducting durability tests, to study the Shear behaviour of textile fibre sheets covered concrete by experimental investigations and to compare the shear and flexural performance of textile fibre sheets covered concrete composite beam with conventional steel reinforced concrete (SRC) beams.

The aim of the present study is to examine the flexural performance of RC Beams strengthened with carbonized textile fibre sheets. Parameters, namely, the type of adhesive poxy resin binder for bonding carbonized textile fibre to beam; the number of layers of carbon textile fibre sheet and rate of loading (0.5mm/min and 2mm/min) were studied

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