

RECENT ADVANCEMENTS IN RETROFITTING AND STRENGTHENING OF RCC: A REVIEW

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Abstract

This paper briefs the literature review covering the characterization of Reinforced Cement Concrete such as compressive strength, flexural strength and shear strength. As it is already proven that Carbon Fiber Reinforced polymer plays a vital role in the retrofitting and strengthening of RCC members therefore literature on the effect of CFRP on RCC is also presented in this paper. It starts with the introduction and important behavioral response of FRP. Also, a brief insight is given on the influence of different techniques to repair and strengthen the damaged structural members.

Keywords: *Fiber Reinforced Polymer, Concrete, Flexure strength, Repair and strengthening technique.*

Introduction

Reinforced Cement Concrete is very well-known development material utilized for basic segments of a structure like beams, columns and slabs. One significant imperfection of RCC is its condition to ecological assault. This can seriously try to reduce the quality and life of the structures. The fix of fundamentally decayed RC Structures become vital since the auxiliary component stops to give good quality and improve life span of specimens. There are right smart variety of existing solid structures in India that don't fulfill current style guidelines. as a result of lacking plan and development. They need auxiliary up degree to meet new seismic design requirements. The reasons for loss of strength may be due to changes in loading, reinforcement corrosion, construction errors, additional loadings or changes in configuration or accidents such as earth quakes or due to fire etc. There are a few different ways for flexural strengthening, for example, area expansion, steel plate holding, outside post tensioning technique, remotely strengthened framework and close surface mounted (NSM). many strategies we can apply for strengthening to concrete. Those are outside holding of cutting edge FRP has become exceptionally well known around the world. The development of study epoxy has caused a way that has nice potential in upgrading structure by retrofitting. Reinforced Concrete structures using externally bonded Fiber Reinforced Polymer (FRP) composites. It has become intense universal observe, extensively accepted. Flexural Strength of beam getting chance to increase by use of carbon fiber reinforced polymer and glass fiber reinforced polymer FRP bars and sheets adhesively guaranteed to the stress face of the beams for increasing the flexural quality of the beams. And also bonded to the vertical faces for increasing the shear strength.

Literature review

A.A. El-Ghandour. [1] This Paper having the content about the experimental and analytical investigation of CFRP flexural and shear fortifying efficiencies of RC beams. They were made half-scale beams, with various flexure and shear interior steel proportions, were tried in three-point loading. finally concluded the CFRP flexural reinforcing productivity is sensitive to the flexural level of harm. This harm level ought to be satisfactorily evaluated in plan.

M.R.KIANOUSH,M.R.ESFAHANI,et.al.,[2]This paper researches flexural execution of strengthened RCC beams reinforced by CFRP sheets. In this experiment twelve beams different specimens were cured and tested. Beam sections made with three different reinforcing ratios were used in those cubes. They were tested nine beams for flexural by CFRP sheets. Remains test beams were considered as for the references. Beams were tried under a four-point load system with a hydraulic jack. finally, the test results and calculated quality and firmness of the reinforced beams expanded contrasted with the control specimens.

Sushil S. Sharma, Urmil V. Dave, Himat Solanki [3] The investigation was done on square RC column. The corner radii and the layer of FRP were varied. Specimen dimension on small scale was of 125x125mm of length 1200mm. FRP wrapped columns were compared with unwrapped columns. The outcome shows that the corner radii having same as concrete cover is better in improving ultimate load bearing capacity than corner radii smaller to concrete cover.

Alper Ilki et.al [4]Alper make 60 specimens out of them 40 were low strength and rest of medium strength and applied with CFRP jackets and load being applied with CFRP jackets and load being applied uniaxial load thickness bonding angle load type etc took under consideration studied then so formed results are CFRP increase the compressive strength of circular and square column 1.4 – 6.9 and 6.5 – 50.0 times respectively .CFRP jackets resist the buckling of longitudinal bars. The max transverse strain for low and medium strength specimens are 0.007-0.018& 0.012 - 0.015 respectively. while the expansion in corner span of rectangular examples gave fundamentally higher axial strength, no unmistakable impact was seen on deformability.

Dr. Sujeva Setunge [5] watched conduct of the bound segments was like the unconfined segments up to the pinnacle heap of the unconfined segments. Increments in the sidelong redirection of the bound segments brought about the solid flopping in pressure and breaking the FRP binding coat at around mid-stature. The avoided type of the sections at top burden was even, and there was no neighborhood locking in the segments.

PANNIRSELVAM. AND MURALI.G. [6] they were made an undertaking to deal with a significant reasonable issue. That is experienced in reinforcing of bars with different very surprising totally different kind and various thicknesses of fiber supported synthetic compound

overlay. The thickness of FRP in the fortifying framework gives a costly and adaptable answer for broadening the life expectancy of strengthened construction industry.

YOGESHINDOLIA AND DR. GOPAL RAI [7] plates, segments and beams may be strengthened in flexure using FRP composites clung to weight zone using epoxy as a typical cement. The bearing of fibers is held parallel to that of high pliable anxieties. FRP strips and FRP sheets both are applied to bars. Thus, FRP composites are discovering approaches to demonstrate powerful and efficient simultaneously. Cost requirement is kept aside, fiber wrapping framework has been demonstrated to be a framework which has many included points of interest over customary fortifying procedures.

Ahmed m.KHALifa.[8]This paper shows flexural execution to control beams had reinforced with close to surface mounted CFRP strips. Six full-scale, RC pillars were more stiffed with different CFRP plots and attempted. These shafts were expected opportunity to disappointment in a flexural made. The outcomes were showed up if a comparative proportion of CFRP is used, bars sustained with NSM strips achieved higher outrageous weight than those fortified with EBR. Such increment in a conclusive weight extent expanded b/w 12% and 18%.

Hee young lee,et.al.,[9]In this paper flexural strengthening of reinforced concrete pillars with pre-stressed close to surface mounted CFRP systems. Eight RC beams. four specimens were fortified with pre-pressure NSM CFRP beams. Remaining three bars were stiffed with pre-pressure NSM CFRP beams. those specimens were tested under four-point load test. At last test outcomes indicated post pressure NSM beams were FEM model to endorse the proposed model. The help length and pre-concentrating on control were used as parameters to look at effects of sustaining execution in proposed numerical model.

Hamidrezatahsiri,et.al.,[10]This paper examines trial investigation of RC jacketed and CFRP strengthen RC beams. in this trial twelve reinforced beams and three reference examples to place the two methods in to prospective Under three-point loading test. In any case, the FRP reinforced beams bomb in a generally little redirection due to the untimely. FRP debonding when applied RC jacketing can likewise improve adaptability, at any rate the FRP system can't give satisfactory flexibility. Subsequently, the RC jacketing can be used in seismic zones as an alternative rather than the FRP strategy.

Jia yang, lianguang wang. [11] Experimental show in this paper trial look into on flexural practices of harmed PRC bars fortified with NSM CFRP strips. under over stacking. twisting test was completed to assess the impacts of three factors. one was cycle number, second over-burden plentifulness and last was reinforcing under stacking. Cycle number and over stacking abundance controlled predominantly unique harm degrees lastly test result appeared. That reinforcing with NSM CFRP strips could viably repress break advancement. contrasted and the unstrengthens pillar.

A.f.ashour,S.A.El-REFaie,et.al.,[12]This paper examines the flexural reinforcing of RC ceaseless bar utilizing CFRP overlays. sixteen fortified concrete ceaseless bars with having various courses of action of interior steel bars and outside having carbon fiber strengthened polymer covers. Each test models had the proportional geometrical estimations and they were requested in to three get-togethers of internal steel stronghold. Various parameters including the length, thickness, position and type of break. Those examples were tried with the assistance of four-point load. At long last outcomes indicated most shafts were near accomplishing their flexural limit and longitudinal versatile shear pressure.

Conclusion

In this project investigation were made on the flexural behavior of reinforced concrete beams strengthened with different sizes of cfrp sheets and out comes are studied.

- As from the studies cfrp provides more strength to retrofitted rcc beams.
- Cfrp component having brittle nature. to control this brittle nature, we can add various fibers.
- Tensile strength has been increasing when we are adding cfrp wrap to rcc beams.

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