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Review of GRPF Strengthened Beam

M. Tech. Scholar Deepak Birla, Asst. Prof. Ashwin Hardiya
Department of Structural Engineering
Dr. A.P.J. Abdul Kalam University, Indore
birla.deepak2410@gmail.com, Kksharma18685@gmail.com

***Abstract*: Fiber-reinforced polymer (FRP) materials are used in different configration and techniques for strengthening of Reinforced concrete (RC) elements to ensure their longer service life. Use of FRP material as Externally bonded surface is one of the popular strengthening techniques that consists of bond in FRP material using primer and saturant.**

***Keywords*: Beam, GRPF, Strengthening techniques.**

I. INTRODUCTION

A large number of structures constructed in the past using the older design codes in different parts of the world are structurally unsafe according to today's design codes. Replacement to of such deficient structures in cursa huge amount to for public money and time. Strengthening has become the acceptable way of improving the load carrying capacity and extending the service lives of such buildings. Strengthening with adhesive bonded fiber reinforced polymers (FRP) has been established as an effective method applicable to many types of concrete structure such as columns, beams, slabs, and walls.

II. RESEARCH FINDING

Sing-PingChiew [2002] studied the flexural behavior of rein forced concrete beams strength hened with GFRP laminates. Ten strengthened beams and two non-strengthenedbeams OSF size 200 mm x 350 mm were tested. A number of external GFRP laminate layers and bond length of GFRP laminates in shear span are taken as the test variables. By bonding GFRP laminates to the tension face of flexural RC beams, bothstrength and stiffness of the beams can be increased.

R. Balamurali krishnan and **Antony Jeyasehar** [2009] studied the flexural behavior of carbon fiber reinforced polymer (CFRP) strengthened reinforced concrete (RC) beams. For flexural strengthening of RC beams, total ten beams were cast and tested over an effective span of 3000 mm up to failure under monotonic and cyclic loads. The beams were designed as under-reinforced concrete beams. Eight beams were strengthened with bonded CFRP fabric in single layer and two layers which are parallel to beam axis at the bottom and tested until failure; the remaining two beams wereusedascontrolspecimens.

AhmedKhalifa and **Antonio Nanni** [2007] examined the shear performance and modes of failure of rectangular simply supported reinforced concrete beams designed with shear deficiencies.Twelve full-scale beam specimens with a total span of 3,050 mm and a rectangular cross section of 150-mm wide and 305-mm deep were tested.

Two different effective spans to depth ratio (l/d) 3 and 4 was taken. Three different strengthening schemes One ply of CFRP U-wrap strips, one ply of continuous CFRP U-wrap, 90◦ and Two plies of CFRP, 90◦/0◦ were applied. The contribution of externally CFRP reinforcement to the shear capacity is influenced by the shear span to depth ratio. Increasing the amount of CFRP has not resulted in a proportional increase in the shear strength.

Bimal Babu Adhikary [2004] studied eight RC beam of size 150 mmx 200mmx 2600 mm.The test variable kept were CFRP sheet depth, number of sheet layer and direction of fiber alignment. Externally adhesive bonded flexible carbon-fiber sheets were used in strengthening of RC beams in shear. The strength increases with the number of sheet layers and the depth of sheets across the beam section. Among the various schemes of wrapping studied, vertical U-wrap of sheet provided the most effective strengthening for concrete beam. Beam strengthened using this scheme showed 119% increase in shear capacity as compared to the control beam without any strengthening.

III. CONCLUSIONS

1. FRP is a great way to strengthen the beams.
2. FRP can increases the bending capacity (when applied at bottom), as we increase no of layers the capacity also increases.
3. FRP can also increase the shear capacity when U-warping is done.
4. Strengthening can show a result of 119%in shear than beam without any strengthening.

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