

EXPERIMENTAL STUDY ON FLEXURAL BEHAVIOUR OF R.C BEAMS RETROFITTING WITH KEVLAR FIBER SHEET AND FIBER GLASS MESH

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Abstract:- Now The present study in the project with the flexural behaviour of beams having we casting the total 36 beam tested. beam size of 150x150x700mm. Will be casted, which will consist of 6 control specimen group of 3 each for concrete grade of M-20 and M-25. 18 beams will be casted with M-20 grade of concrete and its retrofit by 5 patterns. Similar 18 beams for M25 grades will be casted. And result is compared with the normal specimen for flexural strength of the beam. Kevlar fibre retrofitting with U- wrapping pattern improved the ultimate load carrying Capacity and flexural strength of R.C beams significantly high than another wrapping pattern.

Keywords:- Retrofitting of Beam, Flexural Strength, Kevlar Fibber Sheet, Glass fibre mesh, wrapping pattern Etc.

INTRODUCTION

Now the day Many Existing structures required after some year after construction of projects. Some repairing the work required because some factor affecting the as like rebar corrosion, failure of bonding between beam-column, and to aspects sudden loading like impact, fatigue, earthquake, etc.

So, this type conditions there are two options are available for this type condition first one is replacement of parts and second is retrofitting.

A Replacement of parts is very costly and long lasting proses for repairing work and also coast this high for this work can be doing.

Now second options are bater this one is Retrofitting the structure are easily work completed and cheap costing for the doing the work.

The Retrofitting work is the easily complete in short time.

MATERIAL PROPERTIES AND MIX PROPORTIONS

Materials

Cement

We are uses Ordinary Portland cement of 53 grade by and compony Abuja cement was used. And add in concrete mixes use corresponding to IS-8112. And material Specific gravity of cement is 3.15

Fine Aggregate:-

Now we use the for Fine Aggregate for Locally River sand is used. We used proposition mix as per is:2386 9part9)-1963 The bulk specific gravity in dry condition and water absorption of fine aggregate are 2.65 and 1.70 % Respectively.

Coarse Aggregate:-

We Used As coarse aggregate Crushed stone of Maximum size 20 mm Maximum used. We used Mix Preposition per is : 2386 9part9)-1963 and bulk specific gravity in dry condition and water absorption of coarse aggregate is 2.85

Water

We used Natural water are used to in concrete mix and for the curing.

Kevlar fiber

The Kevlar fibre is a heat -resistant, high tensile material and strong syndic fibre, Regarding the compare other materials armies’ type such that Nomex and Technorama Are Developed by Stephanie Wolak at DuPont in 1965, The high tensile material is in compare the other material. This material first time used in 1970 as replacement for steel in racing tires. This fibre in many uses in racing car Tiber, high cable, fire gloves, and clothes, high gloves bulletproof vests, this material is very high tensile compare to steel because this material five-time tensile capacity off steel.

Table -1: Properties of Kevlar fibre

Properties	Unit	Specification
Density	q/cm2	1.44
Thickness	mm	.3+-0.03
Width	Mm	1000+-10%
Fabric Aerial Weigh	/m2	220+-3%
Tensile Strength fiber	Gap	2.4-3.6
Tensile Strength Modulus	Gap	60-120
Wave Style	-	Plain

Glass fiber mesh

We are use other material as a fiberglass mesh. This material used for plastering, installation levelling floors, watering proofing, crack repaying and plastering in order to prevent cracking or fraying of the plaster.

This material is very low cost and not burn easily. very low Wight and high strength.

Typical Properties of Glass fibre Mesh

Width: 1m,

Mesh size 2 × 2mm - density 60g/m2;

Mesh size 5 × 5mm - density 160g/m2:

Reinforcement fiberglass exterior - 160g/m2 (5 × 5mm) is a reliable reinforcement of the plaster layer on the outer walls of buildings

Mix Proportions Epoxy Resin

We used as epoxy resin is binding material with high tensile and high viscosity, we can be used for surface laying and filing to the large repairing.

Mix Design

Noe in mix design We design the standard grade of concrete M-20 and M-25 calculated as per is code 10262-2009. For each components the as per follows IS guild lines content, we take W/C ratio were .55 and .50 Respectively were determined by trial Mixture. respectively were determined by trial mixtures. The mix design is given in table-2

Show in below table:-2

Table -2: As Mix Design below Proportions

Material	M-20	M-25
Cement	310 kg/m ³	320 kg/ m ³
Water	170 kg/m ³	160 Liter
Fine aggregate	728 kg/m ³	744 kg/ m ³
Coarse aggregate	1277 kg/ m ³	1305 kg/ m ³

EXPERIMENTAL WORK

Reinforcement Detail

Main Reinforcement :-4no-10mm Diameter

Sher reinforcement :- 8mm Diameter @100c/c

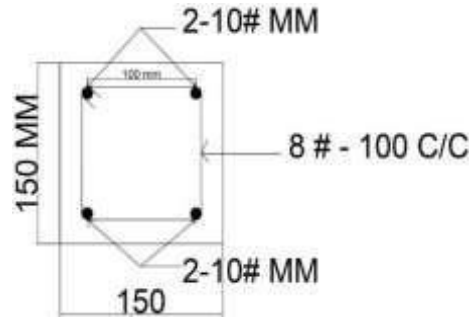


Fig-1: Reinforcement Detail

Casting of Beams

Three Iron molds are used for casting the beam. And lay up oiled inside surface to due to easily removing of the beam after casting from the molds.



My Beams Main steel bar is 2 Nos. of Top and were reinforced with 2bars of 10mm diameter in Top and 2 hanger bars of 2 Nos. 10mm diameter in bottom. At the main bar type clear cover 8mm vertical stirrups at equal spacing were used.

Test Setup of Beam :-



Beam are tested under UTM with capacity of 2000KN arrangement is shown in Fig.

Sr. No	Beam Notification	Loads at initial Crack(KN)	Ultimate Load (KN)
1	M-20	42.20	55.14
2	M-25	59.12	68.20

Retrofitting of Beam:-

We apply the method is Hand la-up for strengthen of beam. The surface for beam rough with brushing and cleaned.

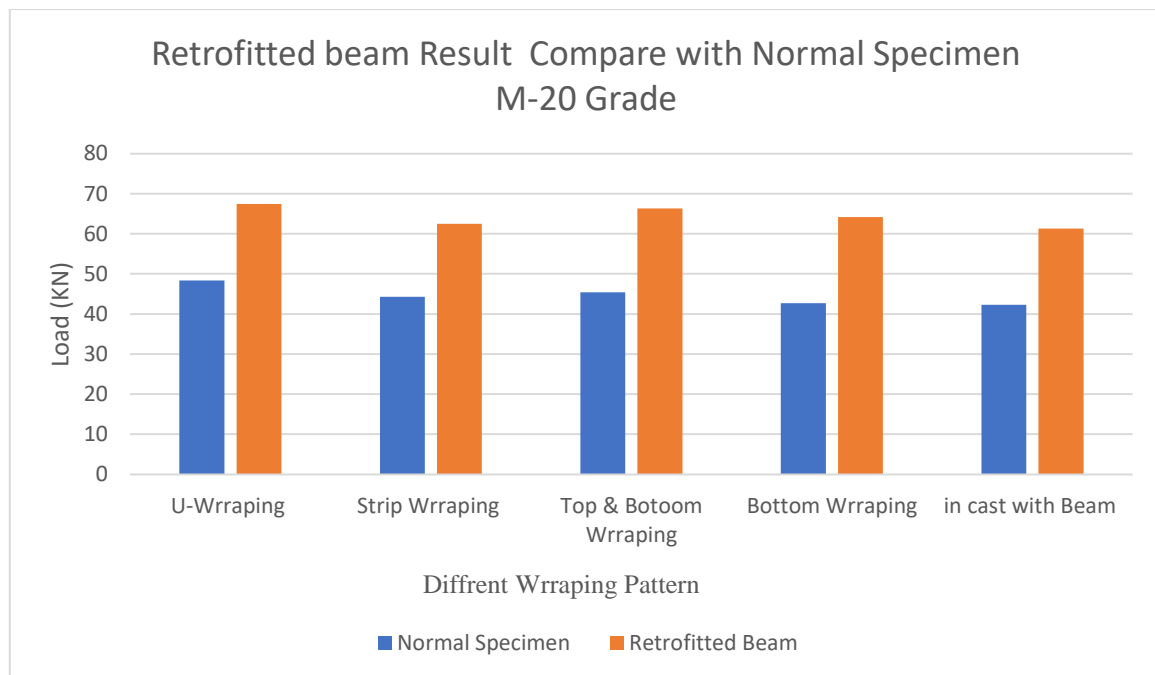


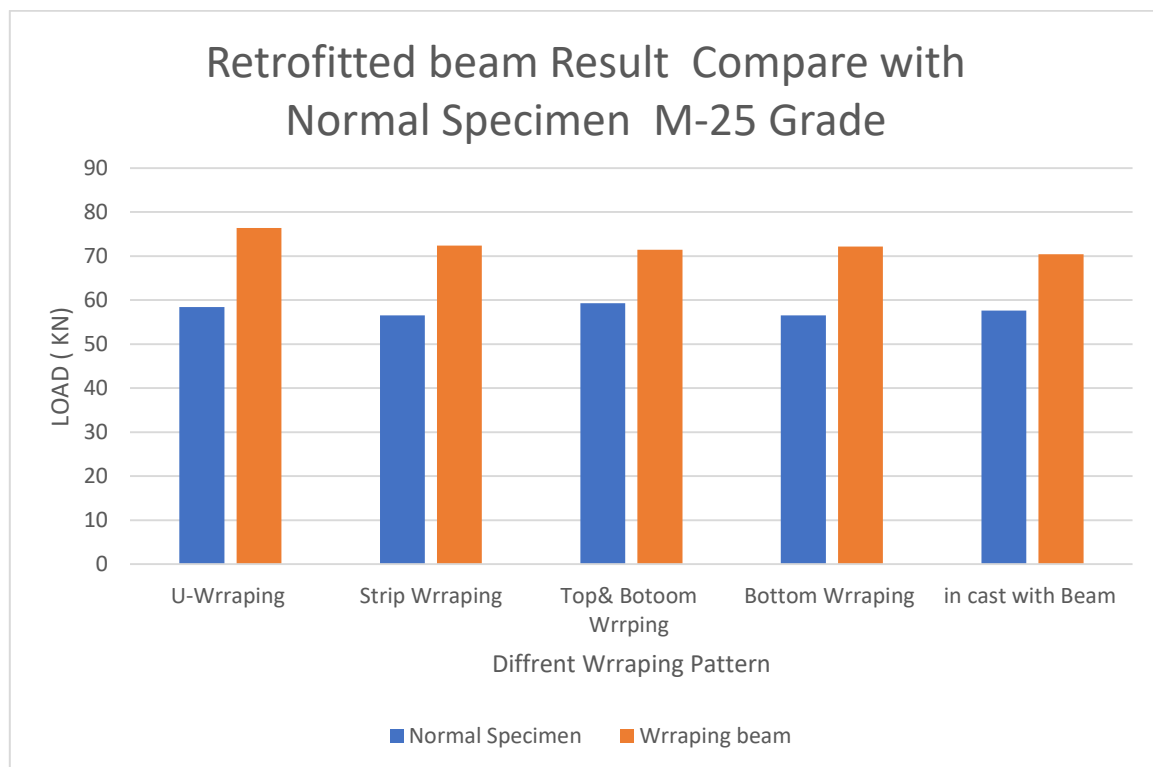
At layer of resin and harder (2:1) is applied at a Surface of the beam approx. 1mm with brush.

Result: -

Table -5: Strength increases of retrofitted for M-20 M-25 .

Sr.No	U-Wrapping	Strip Wrapping	Top-Bottom Wrapping	Bottom Wrapping	In casting With Beam
M-20	67.44	64.13	66.28	62.45	61.30
M-25	73.52	72.15	71.45	72.40	70.43





CONCLUSIONS

Now after check the all the result are show Retrofitting of all beam specimens are different wrapping pattern. U-Shape is maximum carrying capacity are compare to other different patten.

The U- Shape pattern is maximum Load carrying the other different pattern, from the both grade of concrete (M-20 and M-25)

The results indicate that after Retrofitting possess ultimate load carrying capacity of beam for sample increases of after retrofitting compared to normal sample beam approximately 25% strength improved for both grade of concrete M-20 and M-25.

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