

Analysis of Ferrocement Jacketing on Retrofitted Beams

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Abstract

Almost all the structures whether or not or not industrial, business or housing area unit fabricated from RCC. These structure fare nicely to a lower place ancient circumstances, but among the event of maximum earthquakes, giant load imposition etc. The permanent injury may takes place in structure. It poses a more durable scenario for a structural engineer than constructing a replacement building. This could be as a result of form of restraints associate already created building offers like non designed construction, wear & tear etc. instead of turning apart the structure one can strengthen the deficient structural elements of the structure. As a result of the advancement in technology with the help of non-destructive testing one can merely verify such deficient elements. Once known the only reply is to retrofit such elements. Retrofitting is completely different from repair or rehabilitation. It's primarily a way of strengthening Associate in Nursing sweetening of the performance of deficient structural elements in an extremely structure or as complete structure. In deficient buildings retrofitting could also be done by increasing the strength, stiffness and/or malleability of its specific constituent elements or of the whole building. For any building, relying upon the need, a mixture of the on prime of could also be elite. Retrofitting of individual members or elements is remarked as native retrofitting. Someone is not once it involves spoilt for alternatives retrofitting, he possesses to detain mind form of selections before embarking on the work of retrofitting. The alternatives on the market embrace fiber bolstered Plastic or GFRP, Carbon Fiber bolstered Plastic or CFRP or Ferrocement.

Keywords: *Retrofitted Beams, Ferrocement, Energy Absorption.*

1. Introduction

Most of the structures we have a tendency to lay our eyes on area unit invariably product of bolstered

Cement Concrete or RCC because it is often known as albeit it's a beautiful construction material, however once set it's terribly tough to extend its strength or alter its shear or flexure strength. Another major disadvantage with RCC is that at the most places it's for the most part factory-made by unskilled staff, and if ostensibly minor however small print, if not unbroken in mind results in RCC of reduced strength. A number of these points area unit increase in water cement quantitative relation, improper solidification etc. Strengthening the concrete might become necessary for variety of reasons, like substandard particularization of the steel reinforcement and deterioration of the concrete beneath severe environmental conditions. Alternative desires for strengthening arise as a result of either the look codes have modified that create these structures substandard or larger hundreds area unit permissible on the parts of the infrastructure wherever intensive retrofitting is needed [Rochette & Labossiere 2000]. The transformation of non-engineered construction into associate built one thus must be specified it can be sustained. Once talking of RCC buildings they'll be created to endure 3 totally different R's particularly repair, rehabilitation & retrofitting. Repair is partial improvement of the degraded strength of a building once associate earthquake. In effect, it's solely a cosmetic sweetening. Rehabilitation could be a useful improvement, whereby the aim is to realize the first strength of a building once associate earthquake. Retrofitting suggests that structural strengthening and sweetening of performance of deficient structural components of a building to a pre- outlined performance level, whether or not or not associate earthquake has occurred. The unstable performance of a retrofitted

building is aimed above that of the first building. Surveys of existing residential buildings reveal that several buildings aren't adequately designed to resist earthquakes. Within the recent revision of the Indian earthquake code [IS 1893:2002], several regions of the country were placed in higher unstable zones. As a result several buildings designed before the revision of code might fail to perform adequately as per new code. It's thus counseled that the prevailing buildings be retrofitted to enhance their performance within the event of associate earthquake and to avoid massive scale injury to life and property.

The methodology adopted for these ought to be straightforward in execution, provide higher performance even once handled by less knowledgeable staff, should involve materials that area unit promptly obtainable, and however sturdy, sturdy and economical. Ferrocement is one such material that might afford to supply answer to such a scenario. Ferrocement could be a form of skinny wall concrete unremarkably made of cement mortar bolstered with closely spaced layers of continuous and comparatively little size wire mesh. In its role as a skinny concrete product and as laminated cement based mostly composite, ferrocement has found itself in various applications each in new structures and repair, rehabilitation & retrofitting of existing structures.

2. Results and Discussion

The six beams stressed to fifty maximize final load are currently retrofitted victimization ferrocement jacketing. These are tested to failure & their load-deflection in conjunction with that of non-retrofitted counterparts is conferred in & shown diagrammatically.

3. Behaviour of Retrofitted Beams

The retrofitted beams R1 & R2 follow the curves of their various management beams C1 & C2 specifically for initial loading, and then the curves of R1 & R2 run parallel & higher than the curves of C1 & C2. This shows a rise within the load carrying capability of the retrofitted beam. However, the curves of retrofitted and management beams, R3 & C3 virtually coincide until seventy five maximize the final work load, once that they follow identical

pattern as R1 & R2. Load-deflection curves of all the beams C1, C2, C3 & R1, R2 & R3.

Also for beams having same proportion of reinforcements the retrofitted beams have a far smaller deflection as compared to manage beams, this can be because of accumulated stiffness of the retrofitted beams.

4. Impact of proportion of reinforcement on final load

The absolute values of final masses, final deflections & energy absorptions conjointly shown are the sharp age increase of the values of retrofitted beams w.r.t. management beams i.e. increase in price of final deflection of beam R1 compared to the worth of C1 & therefore on. It's discovered that with the retrofitting of beams there's a rise in final load price of ready of beams. This will increase with increase in proportion of reinforcement for R1 to R2 however as we've got discovered. For beam R3 in over bolstered therefore the increase in final load is a smaller amount than that of R3. This could be attributed to the beam R3 being over bolstered as compared to others.

5. Impact of proportion of reinforcement on energy absorption

The values of energy absorption conjointly follow the same pattern because the values of final deflection. The retrofitted beam R1 and R2 follow the curves of C1 and C2 specifically until tiny masses then the curves of R1 and R2 run parallel and higher than the curves of C1 and C2. This shows a rise within the load carrying capability of the retrofitted beam. The curves of R3 and C3 virtually coincide until seventy fifth of final load once that this follow identical pattern as R1 and R2.

Comparing the proportion increase in energy absorption price of C1-R1, C2-R2 and C3 -R3, we tend to observe that the vary of this can be increase is between 5%-10%. Hence there's not a considerable increase in energy absorption capacities of the beams once retrofitting. This is because of the actual fact that we tend to had retrofit the

beams once pre-stressing it to fifty maximize final load.

Load deflection curves of all beams C1, C2, C3, and R1, R2, R3 are premeditated. Also the beams having same proportion of reinforcements the retrofitted beams have a far smaller deflection as compared to manage beams, this is because of accumulated stiffness of the retrofitted beams.

6. Conclusions

The study is dispensed to analyze the impact of ferrocement jacketing on strength and repair ability parameters of strong RCC beams varied proportion of tension steel. Supported the work dispensed:

- 1) The final load, the energy absorption values & safe load will increase with the rise in proportion of tensile reinforcement beam.
- 2) Retrofitting victimization ferrocement jackets is effective for all beams stressed to 50% of their final load for all beneath bolstered beam.
- 3) Retrofitting of beams with ferrocement jacketing considerably decrease the deflection of the beam indicating a better degree of stiffness of beam.
- 4) Retrofitting provides higher energy absorption capability for all beneath bolstered beams however become constant with increase in proportion of tension reinforcement.

The present work has been dispensed solely retrofitting on beams having for strengthening of tension steel solely. This work may be more extended to parameter additionally.

Effect of following parameters additionally

- 1) Effect on doubly bolstered beams.
- 2) Effect of variation of member of ferrocement bolstered beams.
- 3) Variation in compression reinforcement sole

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