

UNIT-6

Repair and Strengthening of Reinforced Concrete Beam-Column Joints: State of the Art

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1. INTRODUCTION

RESEARCH SIGNIFICANCE

2. REPAIR AND STRENGTHENING TECHNIQUES FOR BEAM-COLUMN JOINTS

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Concrete jackets continues...

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3. CONCLUSIONS

From the literature review on the performance, repair, and strengthening of nonseismically detailed RC beam-column joints presented in this paper, the following conclusions were drawn:

1. The critical nonseismic joint details in existing RC structures have been well-identified as shown in Fig. 1; however, the investigation of their effects on seismic behavior have been limited to testing of isolated one-way joints (no floor slab, transverse beams, or bidirectional loads) to a very large extent, and 1/8- and 1/3-scale building models that may not accurately simulate the actual behavior of structural details;
2. Epoxy repair techniques have exhibited limited success in restoring the bond of reinforcement, in filling the cracks, and restoring shear strength in one-way joints, although some authors believe it to be inadequate and unreliable.¹³

The authors believe that injection of epoxy into joints surrounded by floor members would be similarly difficult;

Conclusion

3. Concrete jacketing of columns and encasing the joint region in a reinforced fillet is an effective but the most labor-intensive strengthening method due to difficulties in placing additional joint transverse reinforcement.

Welding an external steel cage around the joint instead of adding internal steel has also proven effective in the case of a three-dimensional interior joint test. These methods are successful in creating strong column-weak beam mechanisms, but suffer from considerable loss of floor space and disruption to building occupancy;

An analytical study showed that joint strengthening with reinforced masonry units can lead to desirable ductile beam failures and reduction of interstory drifts; however, no experimental data are available to validate their performance;

REFERENCES

Engindeniz, M.; Kahn, L. F.; and Zureick, A., "Repair and Strengthening of Non-Seismically Designed RC Beam-Column Joints: State-of-the-Art," *Research Report No. 04-4*, Georgia Institute of Technology, Atlanta, Ga., Oct. 2004, 58 pp. (available online at <http://www.ce.gatech.edu/groups/struct/reports>)

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