



## Strengthening of Reinforced Concrete Beams for Shear Using Concrete Jackets

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### Abstract

Existing reinforced concrete multi-storeyed buildings may be deficient to resist the effect due to earthquake. Of the possible failure modes of beams, shear failure of short span beams is brittle. Although under lateral loads they behave similar to the coupling beams in buildings with shear walls, they are not designed as such. The present study deals with strengthening of such shear-critical beams, by concrete jacketing. The study is investigating the improvement of the capacity and behaviour of short span beams retrofitted by concrete jacketing, specifically for shear. The paper includes a review of prior studies on strengthening of beams using jacketing techniques employing conventional concrete, self-compacting concrete, ferrocement concrete and fiber-reinforced polymers. Results of a numerical analysis are presented to demonstrate the effect of lateral loads on short beams in a typical mid-rise framed building. The effect of jacketing on the shear strength of short beams is demonstrated by testing two specimens under monotonic loading. It is concluded that the use of inclined stirrups is efficient in increasing the shear strength substantially.

**Keywords:** Concrete jacket, Coupling beam, Reinforced concrete building, Seismic retrofit, Shear strength, Short beam