

## Shear Strengthening of Reinforced Concrete Deep Beam Using Fiber Reinforced Polymer Strips

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**Abstract :** Reinforced Concrete (RC) deep beams are one of the main critical structural elements in terms of safety since significant loads are carried in a short span. The shear capacity of these sections cannot be predicted accurately by the current design codes like ACI and EC2; thus, they must be investigated. In this research, non-linear behavior of RC deep beams strengthened in shear with Fiber Reinforced Polymer (FRP) strips, and the efficiency of FRP in terms of enhancing the shear capacity in RC deep beams are examined using Finite Element Analysis (FEA), which is conducted using the software ABAQUS. The effect of several parameters on the shear capacity of the RC deep beam are studied in this paper as well including the effect of the cross-sectional area of the FRP strip and the shear reinforcement area to the spacing ratio ( $A_s/S$ ), and it was found that FRP enhances the shear capacity significantly and can be a substitution of steel stirrups resulting in a more economical design.

**Keywords :** Abaqus, concrete, deep beam, finite element analysis, FRP, shear strengthening, strut-and-tie

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