

## **New Techniques to Decrease the Interfacial Stress in Steel Beams Strengthened With FRP Laminates**

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**Abstract :** One major problem when using bonded Fiber Reinforced Polymer is the presence of high inter facial stresses near the end of the composite laminate which might govern the failure of the strengthening schedule. It is known that the decrease of FRP plate thickness and the fitness of adhesive reduce the stress concentration at plate ends. Another way is to use a plate with a non uniform section or tapered ends and softer adhesive at the edges. In this paper, a comprehensive finite element (FE) study has been conducted to investigate the effect of mixed adhesive joints (MAJ) and tapering plate on the inter facial stress distribution in the adhesive layer, this paper presents the results of a study of application of two adhesives with different stiffnesses (bi-adhesive) along the joint strength length between the CFRP-strengthened steel beam for tapered and untapered plate on the distribution of inter facial stresses. A stiff adhesive was applied in the middle portion of the joint strength, while a low modulus adhesive was applied towards the edges prone to stress concentrations.

**Keywords :** FRP, mixed adhesive joints, stresses, tapered plate, retrofitted beams bonded

**Conference Title :** ICCCE 2015 : International Conference on Civil and Construction Engineering

**Conference Location :** Jeddah, Saudi Arabia

**Conference Dates :** January 26-27, 2015