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Abstract

Strengthening RC beams using FRP laminate becomes one of the main strengthening techniques. Failure of these beams is usually controlled by the bond strength between the laminate and the concrete. As such, ACI 440.2-08 limits the bond strength via a bond reduction factor, which is adopted to reduce the effective strain in the FRP laminate. Equations characterizing the shear strength of such beams, which explicitly include the said bond reduction factor, has been verified for region of high shear stress and negligible normal stress. Such conditions simulate the high shear stress zone in a simply supported beam in the vicinity of the support; however, they fail to mimic the high shear and normal stresses zones in continuous beams existing in the vicinity of any intermediate support. Allegedly, the ACI 440.2-08 adopts the bond reduction factor for zones of combined high shear and normal stresses because “*it is sufficiently conservative*”. Consequently, this paper presents an experimental investigation performed on continuous RC beams strengthened with CFRP sheets: sheets were U-wrapped around the intermediate support of eight two-span beams. The investigation serves to confirm whether or not the currently adopted bond reduction factor is conservative for regions of combined normal and shear stresses.

Keywords: bond reduction factor, CFRP debonding, carbon fibre; reinforced concrete beams; shear strength.

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