Flexural Behavior of Composite Hybrid Beam Models Combining Steel Inverted T-Section and RC Flange

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Abstract : This paper deals with the theoretical and experimental study of shear connection via simple steel reinforcement shear connectors, which are steel reinforcing bars bent into L-shapes, instead of commonly used headed studs. This suggested L-shape connectors are readily available construction material in steel reinforcement. The composite section, therefore, consists of steel inverted T-section being embedded within a lightly reinforced concrete flange at the top slab as a unit. It should be noted that the cross section of these composite models involves steel inverted T-beam, replacing the steel top flange of a standard commonly employed I-beam section. The paper concentrates on the elastic and elastic-plastic behavior of these composite models. Failure modes either by cracking of concrete or shear connection be investigated in details. Elastic and elastoplastic formulas of the composite model have been computed for different locations of NA. Deflection formula has been derived, its value was close to the test value. With a supportive designing curve, this curve is valuable for both designing engineers and researchers. Finally, suggested designing curves and valuable equations will be presented. A check is made between theoretical and experimental outcomes.

Keywords : composite, elastic-plastic, failure, inverted T-section, L-Shape connectors

Conference Title : ICCEAM 2018 : International Conference on Civil Engineering and Applied Mechanics **Conference Location :** London, United Kingdom

Conference Dates : March 15-16, 2018

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