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Local failure behavior of the steel-concrete composite beam with web openings in various shapes under axial tension and uni-axial negative bending

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The prospects of openings on the steel section of the steel-concrete composite beam under combined uni-axial negative bending and axial tension, which may undergo early failure state, have attained slight attention in the open literature such that this is the hypothesis of this study, which is herewith highlighted. A three dimensional numerical model for a composite beam under such combined loads was developed. The characteristic behaviors of material non-linearity, complicated interactions, load applications and boundary conditions were determined based on the nature of this particular case. A comparative study was performed to validate the accuracy of the computer solutions against the existing experimental analysis. The numerical model was then incorporated by a series of numerical analyses with a parametric study, which was the presence of openings on steel beam with different shapes, for examining the influences on the structure. The numerical results predicted provided a better understanding in the fracture behavior of the material components due to the openings with different shapes and ultimate limit behavior of the composite beam. It was found that the shapes of openings on the steel beam can affect significantly the behavior of the composite beam, which must be taken into account in the design models. Moreover, the techniques used in the development of numerical modeling are analyzed extensively in this paper.

Biography

Mahesan Bavan has completed his MSc in Civil and Structural Engineering from National University of Malaysia, Malaysia. He is a Civil Engineer with twelve years of vast professional experiences in planning, designing and directing the constructions of infrastructure, utilities, geotechnical & structural projects. Currently, he is enduring the research to pursue PhD. He has published more than 25 papers in reputed journals and international conferences.

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