

Finite Element Modeling Techniques of Concrete in Steel and Concrete Composite Members

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Abstract : The paper presents a nonlinear analysis 3D model of composite steel and concrete beams with web openings using the Finite Element Method (FEM). The core of the study is the introduction of basic modeling techniques comprehending the description of material behavior, appropriate elements selection, and recommendations for overcoming problems with convergence. Results from various finite element models are compared in the study. The main objective is to observe the concrete failure mechanism and its influence on the structural performance of numerical models of the beams at particular load stages. The bearing capacity of beams, corresponding deformations, stresses, strains, and fracture patterns were determined. The results show how load-bearing elements consisting of concrete parts can be analyzed using FEM software with various options to create the most suitable numerical model. The paper demonstrates the versatility of Ansys software usage for structural simulations.

Keywords : Ansys, concrete, modeling, steel

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