Abstract:

This paper presents results from a nonlinear finite element analysis of hybrid reinforced concrete rectangular section beams. The concept of hybrid R.C. concrete structures was applied by many designers for use in constructions of bridge superstructures. Although the steel reinforcement is often modeled as a linear-elastic material until failure, the linear finite element analysis could not predict the behavior of the R.C. concrete beams model up to failure. Results from material tests and loading tests of beams model indicated that the nonlinearity of concrete should be considered to predict the failure modes. In this study, an effort was made to implement a rate-independent plasticity model, which describes a constitutive model of concrete types (Normal and High Strength Concrete), in a finite element code. Results obtained from the numerical analysis showed a good correlation with the experimental results.

Key Words: Nonlinear Finite elements, Hybrid Concrete, Normal and High Strength Concrete Modeling, and ANSYS.