ABSTRACT

A mixed finite element model using the compliance matrix is proposed for reinforced concrete members. A two dimensional plane stress element is arrived at incorporating the nonlinear stress-strain relationship, material nonhomogenity and microcracking. The model simulates the steel concrete interaction namely the monolithic action and the shear jump across the reinforcement. The nonlinear stress-strain relationship by *Kupfer and Gerstle* is adopted. The material nonhomogenity is brought in through damage parameters $\underline{\beta}$ based on the state of stress. The compatibility relation between the displacement and the stress parameters is established by minimising the error between the stresses derived from the assumed displacement field and the assumed stress field. The compatibility relation for steel is achieved in a similar fashion. The stiffness matrix is obtained by using these relations in the complementary strain energy functional. The most common types of structural elements are analyzed for the numerical validation of the proposed model.