Evaluation of the Minimum Shear Reinforcement Ratio of Reinforced Concrete Members

ABSTRACT

The current Korean Concrete Design Code (KCI Code) requires the minimum and maximum content of shear reinforcement for RC beams in order to prevent brittle and noneconomic design. However, the required content of the steel reinforcement in KCI Code is quite different to those of the other design codes such as fib-code, Canadian Code, and Japanese Code. Furthermore, since the evaluation equations of the minimum and maximum shear reinforcement for the current KCI Code were based on the experimental results, the equations can not be used for the RC members beyond the experimental application limits. The concrete tensile strength, shear stress, crack inclination, strain perpendicular to the crack, and shear span ratio are strongly related to the lower and upper limits of shear reinforcement. In this research, an evaluation equation for the minimum content of shear reinforcement is theoretical proposed from the Navier’s three principals of the mechanics of materials.

Keywords: minimum shear reinforcement ratio, truss model, reinforced concrete beams, compressive strength