1. Experimental Study on the Structural Performance of F_c150N/mm^2 Reinforced Concrete Columns

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In some of the recent super high-rise buildings, F_c100N/mm^2 reinforced concrete columns are applied. Columns are also being developed that use high strength reinforced concrete of F_c150N/ mm^2 class. No existing studies, however, explicitly present the methods for ensuring deformability under high axial forces. In order to solve the problem, therefore, this study tries to grasp the structural performance of F_c150N/mm^2 reinforced concrete columns that are reinforced with steel fiber jacketing and steel plates jacketing by conducting loading tests.
As a result of the testing, it was found that steel-fiber- jacketing and steel-plate- jacketing concrete columns had 10 to 15% higher strength and 20 to 30% better deformability than conventional reinforced concrete columns, and that increasing steel fiber jacketing by 0.5% or increasing steel plate jacketing thickness by 3.2 mm could lead to a marginal deformation angle R of 40 x 10^{-3} rad or larger under a high axial force equivalent to the one at an axial force ratio of 0.5 to which outer columns are subjected during a great earthquake. Thus, design deformability could be fully secured.

Key words: reinforced concrete, columns, steel fiber jacketing, steel plate jacketing, loading tests, structural performance