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Original Article

STUDY OF REINFORCED CEMENT CONCRETE UNDER AXIAL AND FLEXURAL LOADS

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ABSTRACT

Knowing the material and geometrical qualities of members is crucial in structural analysis, particularly for indeterminate systems. The recommended elastic characteristics of concrete and steel are quite precise and are codified in the rules. Modulus of elasticity of concrete is represented as a function of the grade of concrete in the current IS: 456-2000 codal requirements. The concrete modulus of elasticity may be calculated using a variety of methods. Concrete cylinder or cube specimens may be used to plot a stress-strain curve. This curve's incline represents the modulus of elasticity of regular concrete. The modulus of elasticity of concrete may also be calculated using the flexural test of a beam specimen. Secant modulus is often used as the modulus of elasticity for concrete. A tension test on a steel bar may be used to measure the material's modulus of elasticity. Any programme that does analysis on a high-rise structure will only analyse the cross-section of plain concrete, ignoring the influence of reinforcing bars and the confinement of the concrete inside stirrups.

The purpose of the current investigation is to establish the elastic characteristics of reinforced cement concrete beams and columns. When analysing a tall RCC structure modelled as a flat frame, AE and EI are two crucial stiffness parameters to keep in mind. Beams with reinforcement percentages between 0.54 and 1.63% are being tested as part of the experimental programme, with reinforcement percentages between 0.894 and 3.57% being tested on flexural members and columns, respectively, to ensure consistency with the current Codal provisions of IS: 456-2000. The impact of confinement is taken into account here. 3D finite element methods are used to verify the experimental findings.

KEYWORDS: RCC beam, RCC column, high-rise building, Axial Load, Flexural Load, Finite Element

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