Interaction Diagrams for Symmetrically Reinforced Concrete Square Sections Under 3 Dimensional Multiaxial Loading Conditions

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Abstract : The interaction diagrams are functions that define ultimate states expressed in terms of generalized forces (axial force, bending moment and shear force). Two characteristic states for reinforced concrete (RC) sections are proposed: the first characteristic state corresponds to the yield of the reinforcement bars and the second to the peak values of the generalized forces generalized displacements curves. 3D numerical simulations are then conducted for RC columns and the global responses are compared to experimental results. Interaction diagrams for combined flexion, shear and axial force loading conditions are numerically produced for symmetrically RC square sections for different reinforcement ratios. Analytical expressions of the interaction diagrams are also proposed, satisfying the condition of convexity. Comparison with interaction diagrams from the Eurocode is finally presented for the study cases.

Keywords : analytical convex expressions, finite element method, interaction diagrams, reinforced concrete

Conference Title : ICRCCM 2022 : International Conference on Reinforced Concrete, Construction and Materials

Conference Location : Barcelona, Spain

Conference Dates : August 16-17, 2022