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An elasto-plastic and continuum-fracture model foruncracked concrete; 3.3 A three-dimensional zoning concept and anisotropicpost-cracking response; 3.4 Nonlinear structural analysis 4 Nonlinear soil-structure interaction4.1 The complete soil-structure system of nonlinearity; 4.2 Modeling of soil and soil-RC interface; 4.3 Nonlinear static response of underground RC structures; 4.4 A nonlinear dynamic analysis of the RC-soil system; 4.5 The failure/collapse mechanism of damaged undergroundstructures; 5 Three-dimensional analysis of shells and frames; Part 1: Shell elements; 5.1 Introduction; 5.2 Degenerated shell elements and layered formulations; 5.3 Geometrical nonlinearity; 5.4 Integration scheme 5.5 Crack patterns in a shell element subjected toout-of-plane transverse loads5.6 Verification of shell element; Part 2: Frame elements; 5.7 Fiber formulation; 5.8 Verification of frame elements; 5.9 Buckling and spalling models; 5.10 Frame members under large lateral deformation; 5.11 Post-peak cyclic response analysis; 5.12 Geometrical nonlinearity in the collapse of RC piers; 6 Analysis of strengthened and retrofitted structures; 6.1 Background; 6.2 A structural steel model; 6.3 A carbon fiber sheet model; 6.4 A steel-concrete interface model 6.5 Concentric and eccentric compression of strengthenedcolumns6.6 RC columns strengthened by steel encasement; 6.7 RC columns strengthened by carbon fiber sheetwrapping; 7 Nonlinear interaction of multi-directional cracking; 7.1 Crack-to-crack interaction; 7.2 A beam containing pre-cracks: two-way crackinteraction; 7.3 Numerical simulation of non-orthogonal two-way crackinteraction; 7.4 Three-way crack interaction; 7.5 Crack interaction in which two cracks are inclined closeto each other; 7.6 Shear failure of RC members subject to pre-cracking andcombined axial tension and shear; PART II Constitutive modeling of reinforced concrete

Sommario/riassunto

"This book describes the application of nonlinear static and dynamic analysis for the design, maintenance and seismic strengthening of reinforced concrete structures. The latest structural and RC constitutive modelling techniques are described in detail, with particular attention given to multi-dimensional cracking and damage assessment, and their practical applications for performance-based design. Other subjects covered include 2D/3D analysis techniques, bond and tension stiffness, shear transfer, compression and confinement. It can be used in conjunction with WCOMD and COM3 software Nonlinear Mechanics of Reinforced Concrete presents a practical methodology for structural engineers, graduate students and researchers concerned with the design and maintenance of concrete structures."--Provided by publisher.