Ulrich Häussler-Combe **Computational Structural**

Concrete

Theory and Applications 2., erweiterte und verbesserte Auflage

Detailliertes Inhaltsverzeichnis

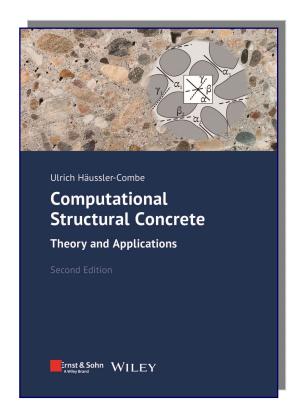
Preface Notations List of Examples

2	Finite Elements Overview
2.1	Modeling Basics
2.2	Discretization Outline
2.3	Elements
2.4	Material Behavior
2.5	Weak Equilibrium
2.6	Spatial Discretization
2.7	Numerical Integration
2.8	Equation Solution Methods
2.9	Discretization Errors
^	11.1. 1.1.0((

2.0	Discretization Errors
3	Uniaxial Structural Concrete Behavior
3.1	Uniaxial Stress-Strain Behavior of Concrete
3.2	Long-Term Behavior - Creep and Imposed Strains
3.3	Reinforcing Steel Stress-Strain Behavior
3.4	Bond between Concrete and Reinforcement
3.5	The Smeared Crack Model
3.6	The Reinforced Tension Bar
3.7	Tension Stiffening of Reinforced Bar
	Otherstand Decree and France

3.4 3.5	Bond between Concrete and Reinforceme The Smeared Crack Model
3.6	The Reinforced Tension Bar
3.7	Tension Stiffening of Reinforced Bar
4	Structural Beams and Frames
4.1	Cross-Sectional Behavior
4.2	Equilibrium of Beams
4.3	Finite Element Types for Plane Beams
4.4	System Building and Solution
4.5	Creep of Concrete
4.6	Temperature and Shrinkage
4.7	Tension Stiffening
4.8	Prestressing
4.9	Large Displacements - 2nd-Order Analysis
4.10	Dynamics
5	Strut-and-tie Models
5.1	Elastic Plate Solutions

J. I	Elastic Plate Solutions
5.2	Strut-and-Tie Modeling
5.3	Solution Methods for Trusses
5.4	Rigid-Plastic Truss Models
5.5	Application Aspects
6	Multiaxial Concrete Material Behavior
~ 4	
6.1	Basics
6.1 6.1.1	Basics Continua and Scales
	25.5.55
6.1.1	Continua and Scales
6.1.1 6.1.2	Continua and Scales Characteristics of Concrete Behavior
6.1.1 6.1.2 6.2	Continua and Scales Characteristics of Concrete Behavior Continuum Mechanics



6.5 6.6 6.7 6.8 6.9	Damage Damaged Elastoplasticity The Microplane Model General Requirements for Material Laws
7 7.1 7.2 7.3 7.4 7.5 7.6 7.7	Crack Modeling and Regularization Basic Concepts of Crack Modeling Mesh Dependency Regularization Multiaxial Smeared Crack Model Gradient Methods Discrete Crack Modeling Overview A Strong Discontinuity Approach
8 8.1 8.2 8.3 8.4 8.5	Plates Lower Bound Limit Analysis Cracked Concrete Modeling Reinforcement and Bond Integrated Reinforcement Embedded Reinforcement with Flexible Bond
9 9.1 9.2 9.3 9.4 9.5 9.6 9.7 9.8 9.9	Slabs Classification Cross-Sectional Behavior Equilibrium of Slabs Reinforced Concrete Cross Sections Slab Elements System Building and Solution Methods Lower Bound Limit State Analysis Nonlinear Kirchhoff Slabs Upper Bound Limit State Analysis
10 10.1 10.2 10.3 10.4 10.5 10.6 10.7	Shells Geometry and Displacements Deformations Shell Stresses and Material Laws System Building Slabs and Beams as a Special Case Locking Reinforced Concrete Shells
11 11.1 11.2 11.3	Randomness and Reliability Uncertainty and Randomness Failure Probability Design and Safety Factors
A A.1 A.2 A.3 A.4 B C	Concluding Remarks Solution Methods Nonlinear Algebraic Equations Transient Analysis Stiffness for Linear Concrete Compression The Arc Length Method Material Stability Crack Width Estimation Transformations of Coordinate Systems



Regression Analysis

Ε

List of Evamples

11.3

LIST OF E	
3.1	Tension bar with localization
3.2	Tension bar with creep and imposed strains
3.3	Simple uniaxial smeared crack model
3.4	Reinforced concrete tension bar
4.1	Moment-curvature relations for given normal forces
4.2	Simple reinforced concrete (RC) beam
4.3	Creep deformations on RC beam
4.4	Effect of temperature actions on a RC beam
4.5	Effect of tension stiffening on a RC beam with external and temperature loading
4.6	Prestressed RC beam
4.7	Stability limit of cantilever column
4.8	Ultimate limit for RC cantilever column
4.9	Beam under impact load
5.1	Continuous interpolation of stress fields with the quad element
5.2	Deep beam with strut-and-tie model
5.3	Corbel with an elastoplastic strut-and-tie model
6.1	Mises elastoplasticity for uniaxial behavior
6.2	Uniaxial stress-strain relations with Hsieh-Ting-Chen damage
6.3	Stability of Hsieh-Ting-Chen uniaxial damage
6.4	Microplane uniaxial stress-strain relations with de Vree damage
7.1	Plain concrete plate with notch
7.2	Plain concrete plate with notch and crack band regularization
7.3	2D smeared crack model with elasticity
7.4	Gradient damage formulation for the uniaxial two-node bar
7.5	Phase field formulation for the uniaxial tension bar
7.6	Plain concrete plate with notch and SDA crack modeling
8.1	Reinforcement design for a deep beam with a limit state analysis
8.2	Simulation of cracked reinforced deep beam
8.3	Simulation of a single fiber connecting a dissected continuum
8.4	Reinforced concrete plate regarding flexible bond
9.1	Linear elastic rectangular slab with opening and free edges
9.2	Reinforcement design for a slab with opening and free edges with a limit state analysis
9.3	Computation of shear forces and shear design
9.4	Elastoplastic slab with opening and free edges
9.5	Simple RC slab under concentrated loading
9.6	Simple RC slab with yield line method and distributed loading
9.7	Simple RC slab with yield line method and concentrated loading
10.1	Convergence study for linear simple slab
10.2	Simple RC slab with interaction of normal forces and bending
11.1	Analytical failure probability of cantilever column
11.2	Approximate failure probability of cantilever column with a Monte Carlo integration



Simple partial safety factor derivation