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Plasticity for Engineers-C. R. Calladine 2000-09-01 This book focuses on the plastic property of materials, and the way in which structures made of such material behave under load. It is intended for civil, mechanical, electro-mechanical, marine, and aeronautical engineers for under-graduate or post-graduate courses or research, and professionals in industry. Professor Calladine, from long experience in teaching, research and industry, here delivers a readable and authoritative account of theory and applications. He presents the classical "perfect plasticity material" as a model of irreversible mechanical behaviour, using this perfect plasticity property to analyse a range of continuum structural problems and metal-forming processes relevant to engineering practice.

Engineering Plasticity-C. R. Calladine 2016-10-13 Engineering Plasticity focuses on certain features of the theory of plasticity that are particularly appropriate to engineering design. Topics covered range from specification of an ideal plastic material to the behavior of structures made of idealized elastic-plastic material, theorems of plastic theory, and rotating discs. Torsion, indentation problems, and slip-line fields are also discussed. This book consists of 12 chapters and begins by providing an engineering background for the theory of plasticity, with emphasis on the use of metals in structural engineering and the nature of physical theories. The reader is then introduced to the general problem of how to set up a model of the plastic behavior of metal for use in analysis and design of structures and forming processes, paying particular attention to the plastic deformation that occurs when a specimen of metal is stressed. Subsequent chapters explore the behavior of a simple structure made of elastic-plastic material; theorems of plastic theory; rotating discs; and indentation problems. Torsion, slip-line fields, and circular plates under transverse loading are also considered, along with wire-drawing and extrusion and the effects of changes in geometry on structure. This monograph is intended for students of engineering.

Plasticity for Engineers-C. R. Calladine 2000

Plasticity Theory-Jacob Lubliner 2013-04-22 The aim of Plasticity Theory is to provide a comprehensive introduction to the contemporary state of knowledge in basic plasticity theory and to its applications. It treats several areas not commonly found between the covers of a single book: the physics of plasticity, constitutive theory, dynamic plasticity, large-deformation plasticity, and numerical methods, in addition to a representative survey of problems treated by classical methods, such as elastic-plastic problems, plane plastic flow, and limit analysis; the problem discussed come from areas of interest to mechanical, structural, and geotechnical engineers, metallurgists and others. The necessary mathematics and basic mechanics and thermodynamics are covered in an introductory chapter, making the book a self-contained text suitable for advanced undergraduates and graduate students, as well as a reference for practitioners of solid mechanics.

Engineering Plasticity-Z. R. Wang 2018 An all-in-one guide to the theory and applications of plasticity in metal forming, featuring examples from the automobile and aerospace industries Provides a solid grounding in plasticity fundamentals and material properties Features models, theorems and analysis of processes and relationships related to plasticity, supported by extensive experimental data Offers a detailed discussion of recent advances and applications in metal forming

Theory of Plasticity-Jagabanduhu Chakrabarty 2012-12-02 Plasticity is concerned with the mechanics of materials deformed beyond their elastic limit. A strong knowledge of plasticity is essential for engineers dealing with a wide range of engineering problems, such as those encountered in the forming of metals, the design of pressure vessels, the mechanics of impact, civil and structural engineering, as well as the understanding of fatigue and the economical design of structures. Theory of Plasticity is the most comprehensive reference on the subject as well as the most up to date -- no other significant Plasticity reference has been published recently, making this of great interest to academics and professionals. This new edition presents extensive new material on the use of computational methods, plus coverage of important developments in cyclic plasticity and soil plasticity. A complete plasticity reference for graduate students, researchers and practicing engineers; no other book offers such an up to date or comprehensive reference on this key continuum mechanics subject Updates with new material on computational analysis and applications, new end of chapter exercises Plasticity is a key subject in all mechanical engineering disciplines, as well as in manufacturing engineering and civil engineering. Chakrabarty is one of the subject's leading figures.

Fundamentals of Engineering Plasticity-William F. Hosford 2013-07-22 William Hosford's book is ideal for those involved in designing sheet metal forming processes. Knowledge of plasticity is essential for the computer simulation of metal forming processes and understanding the advances in plasticity theory is key to formulating sound analyses. The author makes the subject simple by avoiding notations used by specialists in mechanics. R. Hill's authoritative book, Mathematical Theory of Plasticity (1950), presented a comprehensive treatment of continuum plasticity theory up to that time; much of the treatment in this book covers the same ground, but focuses on more practical topics. Hosford has included recent developments in continuum theory, including a newer treatment of anisotropy that has resulted from calculations of yielding based on crystallography, analysis of the role of defects, and forming limit diagrams. A much greater emphasis is placed on deformation mechanisms and the book also includes chapters on slip and dislocation theory and twinning.

Plasticity for Structural Engineers-Wai-Fah Chen 2007-02-15 J. Ross Publishing Classics are world-renowned texts and monographs written by preeminent scholars. These books are suitable for students, researchers, professionals and libraries.

Introduction to the Theory of Plasticity for Engineers-Oscar Hoffman 1953

Basic Engineering Plasticity-David Rees 2012-12-02 Plasticity is concerned with understanding the behavior of metals and alloys when loaded beyond the elastic limit, whether as a result of being shaped or as they are employed for load bearing structures. Basic Engineering Plasticity delivers a comprehensive and accessible introduction to the theories of plasticity. It draws upon numerical techniques and theoretical developments to support detailed examples of the application of plasticity theory. This blend of topics and supporting textbook features ensure that this introduction to the science of plasticity will be valuable for a wide range of mechanical and manufacturing engineering students and professionals. Brings together the elements of the mechanics of plasticity most pertinent to engineers, at both the micro- and macro-levels Covers the theory and application of topics such as Limit Analysis, Slip Line Field theory, Crystal Plasticity, Sheet and Bulk Metal Forming, as well as the use of Finite Element Analysis Clear and well-organized with extensive worked engineering application examples, and end of chapter exercises

Engineering and Plasticity- 1977-06-17

Computational Methods for Plasticity-Eduardo A. de Souza Neto 2011-09-21 The subject of computational plasticity encapsulates the numerical methods used for the finite element simulation of the behaviour of a wide range of engineering materials considered to be plastic – i.e. those that undergo a permanent change of shape in response to an applied force. Computational Methods for Plasticity: Theory and Applications describes the theory of the associated numerical methods for the simulation of a wide range of plastic engineering materials; from the simplest infinitesimal plasticity theory to more complex damage mechanics and finite strain crystal plasticity models. It is split into three parts - basic concepts, small strains and large strains. Beginning with elementary theory and progressing to advanced, complex theory and computer implementation, it is suitable for use at both introductory and advanced levels. The book: Offers a self-contained text that allows the reader to learn computational plasticity theory and its implementation from one volume. Includes many numerical examples that illustrate the application of the methodologies described. Provides introductory material on related disciplines and procedures such as tensor analysis, continuum mechanics and finite elements for non-linear solid mechanics. Is accompanied by purpose-developed finite element software that illustrates many of the techniques discussed in the text, downloadable from the book’s companion website. This comprehensive text will appeal to postgraduate and graduate students of civil, mechanical, aerospace and materials engineering as well as applied mathematics and courses with computational mechanics components. It will also be of interest to research engineers, scientists and software developers working in the field of computational solid mechanics.

Theory of Plasticity-J. Chakrabarty 1987

Fundamentals of the Theory of Plasticity-L. M. Kachanov 2013-09-26 Intended for use by advanced engineering students and professionals, this volume focuses on plastic deformation of metals at normal temperatures, as applied to strength of machines and structures. 1971 edition.

Plasticity-P.M. Dixit 2014-10-23 Explores the Principles of Plasticity Most undergraduate programs lack an undergraduate plasticity theory course, and many graduate programs in design and manufacturing lack a course on plasticity—leaving a number of engineering students without adequate information on the subject. Emphasizing stresses generated in the material and its effect, Plasticity: Fundamentals and Applications effectively addresses this need. This book fills a void by introducing the basic fundamentals of solid mechanics of deformable bodies. It provides a thorough understanding of plasticity theory, introduces the concepts of plasticity, and discusses relevant applications. Studies the Effects of Forces and Motions on Solids The authors make a point of highlighting the importance of plastic deformation, and also discuss the concepts of elasticity (for a clear understanding of plasticity, the elasticity theory must also be understood). In addition, they present information on updated Lagrangian and Eulerian formulations for the modeling of metal forming and machining. Topics covered include: Stress Strain Constitutive relations Fracture Anisotropy Contact problems Plasticity: Fundamentals and Applications enables students to understand the basic fundamentals of plasticity theory, effectively use commercial finite-element (FE) software, and eventually develop their own code. It also provides suitable reference material for mechanical/civil/aerospace engineers, material processing engineers, applied mechanics researchers, mathematicians, and other industry professionals.

Elastoplasticity Theory-Vlado A. Lubarda 2001-07-16 Understanding the elastoplastic deformation of metals and geomaterials, including the constitutive description of the materials and analysis of structure undergoing plastic deformation, is an essential part of the background required by mechanical, civil, and geotechnical engineers as well as materials scientists. However, most books address the subject at a introductory level and within the infinitesimal strain context. Elastoplasticity Theory takes a different approach in an advanced treatment presented entirely within the framework of finite deformation. This comprehensive, self-contained text includes an introduction to nonlinear continuum mechanics and nonlinear elasticity. In addition to in-depth analysis of the mathematical and physical theories of plasticity, it furnishes an up-to-date look at contemporary topics, such as plastic stability and localization, monocrystalline plasticity, micro-to-macro transition, and polycrysalline plasticity models. Elastoplasticity Theory reflects recent trends and advances made in the theory of plasticity over the last four decades. It will not only help stimulate further research in the field, but will enable its readers to confidently select the appropriate constitutive models for the materials or structural members relevant to their own applications.

Theory of Elasticity and Plasticity-Valentin Molotnikov 2021 This book serves as a core text for university curricula in solid body mechanics and, at the same time, examines the main achievements of state of the art research in the mechanics of elastic and non-elastic materials. This latter goal of the book is achieved through rich bibliographic references, many from the authors' own work. authors. Distinct from similar texts, there are no claims in this volume to a single universal theory of plasticity. However, solutions are given to some new problems and to the construction of models useful both in pedagogic terms for students and practical terms for professional design engineers. Examples include the authors' decisions about the Brazilian test, stability of rock exposure, and pile foundations. Designed for both upper-level university students and specialists in the mechanics of deformable hard body, the material in this book serves as a source for numerous topics of course and diploma concentration.

Elements of Plasticity-I. St Doltsinis 2010 Providing the essential theoretical framework for understanding elastoplastic behaviour, this text develops the subject of small strain elastoplasticity from classical theory to modern computational techniques.

The Mathematical Theory of Plasticity-Rodney Hill 1998 First published in 1950, this important and classic book presents a mathematical theory of plastic materials, written by one of the leading exponents.

Foundations of the Theory of Elasticity, Plasticity, and Viscoelasticity-Eduard Starovoitov 2012-07-18 Foundations of the Theory of Elasticity, Plasticity, and Viscoelasticity details fundamental and practical skills and approaches for carrying out research in the field of modern problems in the mechanics of deformed solids, which involves the theories of elasticity, plasticity, and viscoelasticity. The book includes all modern methods of research as well as the results of the authors’ recent

work and is presented with sufficient mathematical strictness and proof. The first six chapters are devoted to the foundations of the theory of elasticity. Theory of stress-strain state, physical relations and problem statements, variation principles, contact and 2D problems, and the theory of plates are presented, and the theories are accompanied by examples of solving typical problems. The last six chapters will be useful to postgraduates and scientists engaged in nonlinear mechanics of deformed inhomogeneous bodies. The foundations of the modern theory of plasticity (general, small elastoplastic deformations and the theory of flow), linear, and nonlinear viscoelasticity are set forth. Corresponding research of three-layered circular plates of various materials is included to illustrate methods of problem solving. Analytical solutions and numerical results for elastic, elastoplastic, lineaer viscoelastic and viscoelastoplastic plates are also given. Thermoviscoelastoplastic characteristics of certain materials needed for numerical account are presented in the eleventh chapter. The informative book is intended for scientists, postgraduates and higher-level students of engineering spheres and will provide important practical skills and approaches.

Introduction to Engineering Plasticity-Tongxi Yu 2022-08-15 The theory of plasticity is a branch of solid mechanics that investigates the relationship between permanent deformation and load, and the distribution of stress and strains of materials and structures beyond their elastic limit. Engineering plasticity underpins the safety of many modern systems and structures. Realizing the full potential of materials as well as designing precise metal processing and energy absorption structures requires mastery of engineering plasticity. Engineering Plasticity presents both fundamental theory on plasticity and emphasizes the latest engineering applications. The title combines theory and engineering applications of plasticity, elaborating on problem solving in real-world engineering tasks such as in metal forming, limit analysis of structures, and understanding the energy absorption of structures and materials. The five main parts of the book cover: Plastic properties of materials and their characterization; Fundamental theory in plasticity; Elastic-plastic problems and typical solutions; and Rigid-plastic problems under plane-stress conditions. This title provides students and engineers alike with the fundamentals and advanced tools needed in engineering plasticity. Brings together plasticity theory with engineering applications and problem solving Elaborates problem solving methods and demonstrates plasticity in various engineering fields Covers the recent decades of research on metal forming and limit analysis Includes energy absorption of new structures and materials where plasticity dominates analysis and design Gives a systematic account of the theory of plasticity alongside its engineering applications

Continuum Theory of Plasticity-Akhtar S. Khan 1995-02-28 The only modern, up-to-date introduction to plasticity Despite phenomenal progress in plasticity research over the past fifty years, introductory books on plasticity have changed very little. To meet the need for an up-to-date introduction to the field, Akhtar S. Khan and Sujian Huang have written Continuum Theory of Plasticity--a truly modern text which offers a continuum mechanics approach as well as a lucid presentation of the essential classical contributions. The early chapters give the reader a review of elementary concepts of plasticity, the necessary background material on continuum mechanics, and a discussion of the classical theory of plasticity. Recent developments in the field are then explored in sections on the Mroz Multisurface model, the Dafalias and Popov Two Surface model, the non-linear kinematic hardening model, the endochronic theory of plasticity, and numerous topics in finite deformation plasticity theory and strain space formulation for plastic deformation. Final chapters introduce the fundamentals of the micromechanics of plastic deformation and the analytical coupling between deformation of individual crystals and macroscopic material response of the polycrystal aggregate. For graduate students and researchers in engineering mechanics, mechanical, civil, and aerospace engineering, Continuum Theory of Plasticity offers a modern, comprehensive introduction to the entire subject of plasticity.

Elasticity and Plasticity-J. N. Goodier 2016-03-17 This volume comprises two classic essays on the mathematical theories of elasticity and plasticity by authorities in this area of engineering science. Undergraduate and graduate students in engineering as well as professional engineers will find these works excellent texts and references. The Mathematical Theory of Elasticity covers plane stress and plane strain in the isotropic medium, holes and fillets of assignable shapes, approximate conformal mapping, reinforcement of holes, mixed boundary value problems, the third fundamental problem in two dimensions, eigensolutions for plane and axisymmetric states, anisotropic elasticity, thermal stress, elastic waves induced by thermal shock, three-dimensional contact problems, wave propagation, traveling loads and sources of disturbance, diffraction, and pulse propagation. The Mathematical Theory of Plasticity explores the theory of perfectly plastic solids, the theory of strain-hardening plastic solids, piecewise linear plasticity, minimum principles of plasticity, bending of a circular plate, and other problems.

The Mechanical and Thermodynamical Theory of Plasticity-Mehrdad Negahban 2012-04-26 Born out of 15 years of courses and lectures on continuum mechanics, nonlinear mechanics, continuum thermodynamics, viscoelasticity, plasticity, crystal plasticity, and thermodynamic plasticity, The Mechanical and Thermodynamical Theory of Plasticity represents one of the most extensive and in-depth treatises on the mechanical and thermodynamical aspects of plastic and visicoplastic flow. Suitable for student readers and experts alike, it offers a clear and comprehensive presentation of multi-dimensional continuum thermodynamics to both aid in initial understanding and introduce and explore advanced topics. Covering a wide range of foundational subjects and presenting unique insights into the unification of disparate theories and practices, this book offers an extensive number of problems, figures, and examples to help the reader grasp the subject from many levels. Starting from one-dimensional axial motion in bars, the book builds a clear understanding of mechanics and continuum thermodynamics during plastic flow. This approach makes it accessible and applicable for a varied audience, including students and experts from engineering mechanics, mechanical engineering, civil engineering, and materials science.

Soil Plasticity-W.F. Chen 1985-11-01 This book is addressed primarily to civil engineers familiar with such traditional topics as strength of materials, soil mechanics, and theory of elasticity and structures, but less familiar with the modern development of the mathematical theory of soil plasticity necessary to any engineer working under the general heading of nonlinear analysis of soil-structure system. This book will satisfy his needs in the case of the soil medium. It introduces the reader to the theory of soil plasticity and its numerical implementation into computer programs. The theory and method of computer implementation presented here are appropriate for solving nonlinear static dynamic problems in soil mechanics and are applicable for finite difference and finite element computer codes. A sample computer model subroutine is developed and this is used to study some typical soil mechanics problems. With its comprehensive coverage and simple, concise presentation, the book will undoubtedly prove to be very useful for consulting engineers, research and graduate students in geotechnical engineering.

Theory of Plasticity and Limit Design of Plates-Z. Sobotka 2013-10-22 An extensive review of the theory of plasticity, limit design and limit analysis of plates is contained in this volume. Detailed descriptions are given on the plastic behaviour of homogeneous, reinforced and sandwich plates, and on the rise of various yield-line patterns. The volume differs from other books on the plastic analysis of plates by its comprehensive treatment of: the theory of yield fans connected with yield-line planning; the plastic behaviour of plates under combined loadings characterized by the load factors; statical solutions; and continuous, rectangular and skew plates. Before discussing the upper-bound solutions for various types of ultimate loads acting on isotropic, orthotropic and anisotropic plates, the kinematic conditions of the plastic behaviour of plates and the principles and methods of the yield-line theory are examined in detail. Generalized yield conditions of the second degree for orthotropic and anisotropic plates are introduced. Special attention is paid to the rise of yield fans. The concept of yield line planning is also discussed, which may be of practical interest since it indicates the possibilities for preventing the rise of yield fans. Upper-bound and lower-bound solutions for the ultimate uniform load, concentrated loads, triangular and trapexoidal loads, are presented. Similar solutions are provided for continuous loads bounded by various plane and curved surfaces and for various combinations of loads acting on rectangular, polygonal, circular, elliptic and skew plates. Solutions are given for plates on hinged supports, on free supports with elevating corners, on point supports and also for plates with built-in edges. Numerical tables are provided for determining the ultimate loads, bearing moments needed for the given load systems and the parameters of yield-line patterns. The procedures detailed in the volume will prove an indispensable reference source in the practical design of roof, ceiling and bridge slabs.

Unified Plasticity for Engineering Applications-Sol R. Bodner 2012-12-06 Considerably simplified models of macroscopic material behavior, such as the idealization for metals of elastic-time independent plastic response with a yield (onset) criterion, have served the engineering profession well for many years. They are still basic to the design and analysis of most structural applications. In the need to use materials more effectively, there are circumstances where those traditional models are not adequate, and constitutive laws that are more physically realistic have to be employed. This is especially relevant to conditions where the inherent time dependence of inelastic deformations, referred to as "viscoplasticity", is pronounced such as at elevated temperatures and for high strain rates. Unified theories of elastic-viscoplastic material behavior, which are primarily applicable for metals and metallic alloys, combine all aspects of inelastic response into a set of time dependent equations with a single inelastic strain rate variable. For such theories, creep under constant stress, stress relaxation under constant strain, and stress-strain relations at constant rates are each special cases of a general formulation. Those equations mayor may not include a yield criterion, but models which do not separate a fully elastic region from the overall response could be considered "unified" in a more general sense. The theories have reached a level of development and maturity where they are being used in a number of sophisticated engineering applications. However, they have not yet become a standard method of material representation for general engineering practice.

Structural Plasticity-Wai-Fah Chen 1991

Plasticity-Sándor Kaliszky 1989 Hardbound. This book is a completely revised English edition of the author's book published in Hungarian in 1975 and in German in 1984. The work provides a comprehensive treatise on the classical theory of plasticity, together with a great number of solution methods and applications on the problems of structural and mechanical engineering.Attention is focused mainly on the formulation and structural applications of the fundamental physical properties and constitutive equations of linearly elastic-perfectly plastic bodies. The treatment is purely phenomenological, and does not enter into the microstructure or the thermodynamics of irreversible deformation processes. Plastic hardening and strain rate effects are briefly reviewed, and the assumption of infinitesimal deformations is adopted. Emphasis is placed on the fundamental relations and theorems of the incremental theory of plastic bodies and on the principles and methods of incremental and limi

THEORY OF ELASTICITY AND PLASTICITY-H. JANE HELENA 2017-07-01 Theory of Elasticity and Plasticity is designed as a textbook for both undergraduate and postgraduate students of engineering in civil, mechanical and aeronautical disciplines. This book has been written with the objective of bringing the concepts of elasticity and plasticity to the students in a simplified and comprehensive manner. The basic concepts, definitions, theory as well as practical applications are discussed in a clear, logical and concise manner for better understanding. Starting with, general relationships between stress, strain and deformations, the book deals with specific problems on plane stress, plane strain and torsion in non-circular sections. Advanced topics such as membrane analogy, beams on elastic foundations and plastic analysis of pressure vessels are also discussed elaborately. For better comprehension, the text is well supported with: Large number of worked-out examples in each chapter. Well-labelled illustrations. Numerous Review Questions that reinforce the understanding of the subject. As all the concepts are covered extensively with a blend of theory and practice, this book will be a useful resource to the students.

Dynamic Plasticity-

Problems of Technological Plasticity-B. Druyanov 2013-10-22 In this book the classical rigid-plastic model of deformed workpiece and the characteristic (slipline) method of analysis is assumed. The rigid-plastic solid assumption is deemed reasonable for the problems of technological plasticity with large scale plastic flow, where small elastic stains are negligible. Along with classical results of the theory of plasticity the book includes many original analytical and numerical solutions of the problems of technological plasticity obtained by the authors in Russia and unknown for most western readers. The results of the analyses are given by analytical formulae and many graphs and tables, so the book will be useful for the practical and research engineers. It may also be used as a textbook by graduate students and engineers.

Dislocation Mechanism-Based Crystal Plasticity-Zhuo Zhuang 2019-04-12 Dislocation Based Crystal Plasticity: Theory and Computation at Micron and Submicron Scale provides a comprehensive introduction to the continuum and discreteness dislocation mechanism-based theories and computational methods of crystal plasticity at the micron and submicron scale. Sections cover the fundamental concept of conventional crystal plasticity theory at the macro-scale without size effect, strain gradient crystal plasticity theory based on Taylar law dislocation, mechanism at the mesoscale, phase-field theory of crystal plasticity, computation at the submicron scale, including single crystal plasticity theory, and the discrete-continuous model of crystal plasticity with three-dimensional discrete dislocation dynamics coupling finite element method (DDD-FEM). Three kinds of plastic deformation mechanisms for submicron pillars are systematically presented. Further sections discuss dislocation nucleation and starvation at high strain rate and temperature effect for dislocation annihilation mechanism. Covers dislocation mechanism-based crystal plasticity theory and computation at the micron and submicron scale Presents crystal plasticity theory without size effect Deals with the 3D discrete-continuous (3D DCM) theoretic and computational model of crystal plasticity with 3D discrete dislocation dynamics (3D DDD) coupling finite element method (FEM) Includes discrete dislocation mechanism-based theory and computation at the submicron scale with single arm source, coating micropillar, lower cyclic loading pillars, and dislocation starvation at the submicron scale

Understanding Structural Engineering-Wai-Fah Chen 2011-05-24 In our world of seemingly unlimited computing, numerous analytical approaches to the estimation of stress, strain, and displacement-including analytical, numerical, physical, and analog techniques-have greatly advanced the practice of engineering. Combining theory and experimentation, computer simulation has emerged as a third path for engineering

Plasticity for Engineers-C. R. Calladine 1985

Limit Analysis and Soil Plasticity-Wai-Fah Chen 2013-07-10 Developments in Geotechnical Engineering, Volume 7: Limit Analysis and Soil Plasticity covers the theory and applications of limit analysis as applied to soil mechanics. Organized into 12 chapters, the book presents an introduction to the modern development of theory of soil plasticity and includes rock-like material. The first four chapters of the book describe the technique of limit analysis, beginning with the historical review of the subject and the assumptions on which it is based, and then covering various aspects of available techniques of limit analysis. The subsequent chapters deal with the applications of limit analysis to what may be termed “classical soil mechanics problems that include bearing capacity of footings, lateral earth pressure problems, and stability of slopes. In many cases, comparisons of limit analysis solution and conventional limit equilibrium and slip-like solutions are also presented. Other chapters deal with the advances in bearing-capacity problem of concrete blocks or rock and present theoretical and experimental results of various concrete bearing problems. The concluding chapter examines elastic-plastic soil and elastic-plastic-fracture models for concrete materials. This book is an ideal resource text to geotechnical engineers and soil mechanics researchers.

Crystal Plasticity Finite Element Methods-Franz Roters 2011-08-04 Written by the leading experts in computational materials science, this handy reference concisely reviews the most important aspects of plasticity modeling: constitutive laws, phase transformations, texture methods, continuum approaches and damage mechanisms. As a result, it provides the knowledge needed to avoid failures in critical systems udner mechanical load. With its various application examples to micro- and macrostructure mechanics, this is an invaluable resource for mechanical engineers as well as for researchers wanting to improve on this method and extend its outreach.

Plasticity of Metallic Materials-Oana Cazacu 2020-11-23 Plasticity of Metallic Materials presents a rigorous framework for description of plasticity phenomena, classic and recent models for isotropic and anisotropic materials, new original analytical solutions to various elastic/plastic boundary value problems and new interpretations of mechanical data based on these recent models. The book covers models for metals with both cubic and hexagonal crystal structures, presents the mechanical tests required to determine the model parameters, various identification procedures, verification, and validation tests, and numerous applications to metal forming. Outlines latest research on plastic anisotropy and its role in metal forming Presents characterization and validation tests for metals with various crystal structures Compares the predictive capabilities of various models for a variety of loadings

Continuum Mechanics and Plasticity-Han-Chin Wu 2004-12-20 Tremendous advances in computer technologies and methods have precipitated a great demand for refinements in the constitutive models of plasticity. Such refinements include the development of a model that would account for material anisotropy and produces results that compare well with experimental data. Key to developing such models-and to meeting many other challenges in the field- is a firm grasp of the principles of continuum mechanics and how they apply to the formulation of plasticity theory. Also critical is understanding the experimental aspects of plasticity and material anisotropy. Integrating the traditionally separate subjects of continuum mechanics and plasticity, this book builds understanding in all of those areas. Part I provides systematic, comprehensive coverage of continuum mechanics, from a review of Carteisian tensors to the relevant conservation laws and constitutive equation. Part II offers an exhaustive presentation of the continuum theory of plasticity. This includes a unique treatment of the experimental aspects of plasticity, covers anisotropic plasticity, and incorporates recent research results related to the endochronic theory of plasticity obtained by the author and his colleagues. By bringing all of these together in one book, Continuum Mechanics and Plasticity facilitates the learning of solid mechanics. Its readers will be well prepared for pursuing either research related to the mechanical behavior of engineering materials or developmental work in engineering analysis and design.

Plasticity-Alexander Mendelson 1983