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Concrete Beams with Openings CRC Press

17 2 STRESS FIELDS FOR SIMPLE STRUCTURES 2. 1 INTRODUCTION In this chapter the behavior and strength of simple structures made of rein forced or prestressed concrete is investigated with the aid of stress fields. In particular, the webs and flanges of beams, simple walls, brackets, bracing beams and joints of frames are investigated. By this means, the majority of design cases are already covered. In reality, all structural components are three-dimensional. Here, however, components are considered either directly as two-dimensional plate elements (i. e. the plane stress condition with no variation of stress over the thickness of the element) or they are subdivided into several plates. Since two-dimensional structural elements are statically redundant, it is possible for a particular loading to be in equilibrium with many (theoretically an infinite number of) stress states. If the lower bound method of the theory of plasticity is employed, then an admissible stress field or any combination of such stress fields may be selected. In chapter 4 it is shown that this method is suitable for the design of reinforced concrete structures, and the consequence of the choice of the final structural system on the structural behavior is dealt with in detail. The first cases of the use of this method date back to Ritter [6] and Morsch [4], who already at the beginning of the century investigated the resultants of the internal stresses by means of truss models.

Principles of Reinforced Concrete Design Springer Science & Business Media

Designed primarily as a text for the undergraduate students of civil engineering, this compact and well-organized text presents all the basic topics of reinforced concrete design in a comprehensive manner. The text conforms to the limit states design method as given in the latest revision of Indian Code of Practice for Plain and Reinforced Concrete, IS: 456 (2000). This book covers the applications of design concepts and provides a wealth of state-of-the-art information on design aspects of wide variety of reinforced concrete structures. However, the emphasis is on modern design approach. The text attempts to:

- Present simple, efficient and systematic procedures for evolving design of concrete structures.
- Make available a large amount of field tested practical data in the appendices.
- Provide time saving analysis and design aids in the form of tables and charts.
- Cover a large number of worked-out practical design examples and problems in each chapter.
- Emphasize on

development of structural sense needed for proper detailing of steel for integrated action in various parts of the structure. Besides students, practicing engineers and architects would find this text extremely useful.

Design of Concrete Structures Springer

This revision of a popular text discusses the behavior, analysis, and design of prestressed concrete structures. Changes in the Second Edition include a new emphasis on partially prestressed concrete members, flexural strength calculations, deflection calculations, crack width calculations, along with new information on high strength materials, and more. Develops an understanding of design methods used in practice and familiarity with the important provisions of the governing 1983 Building Code of the American Concrete Institute. Balance of theory and practice provides a clear survey of design principles. Problems at the end of every chapter illustrate concepts.

Durability Design of Concrete Structures Wiley

The 14th edition of the classic text, Design of Concrete Structures, is completely revised using the newly released 2008 ACI (American Concrete Institute) Code. This new edition has the same dual objectives as the previous editions; first to establish a firm understanding of the behavior of structural concrete, then to develop proficiency in the methods used in current design practice. Design of Concrete Structures covers the behavior and design aspects of concrete and provides updated examples and homework problems. New material on slender columns, seismic design, anchorage using headed deformed bars, and reinforcing slabs for shear using headed studs has been added. The notation has been thoroughly updated to match changes in the ACI Code. The text also presents the basic mechanics of structural concrete and methods for the design of individual members for bending, shear, torsion, and axial force, and provides detail in the various types of structural systems applications, including an extensive presentation of slabs, footings, foundations, and retaining walls.

Design of Reinforced Concrete Structures Wiley

This Fifth Edition maintains the basic Ferguson approach in which design procedures stem from and provide the basis for a clear understanding of the behavior of reinforced concrete. Behavior of reinforced concrete members and assemblages at every load stage is illustrated with illustrations and photos, and calculation models that relate to the physical behaviors are provided to help students and practitioners recognize and assess various design situations. To avoid confusion, many of the examples now use customary or English units, rather than SI units as in the Fourth Edition.

This edition conforms to the technical changes in the '83 and '86 revisions to the ACI Building Code. In this edition, service load analysis of stresses, computations of deflection and distribution of reinforcement to control crack widths have been incorporated with the sections that treat analysis and design of flexural members. Material relating to seismic design has been revised and expanded, and more emphasis has been placed on developing conceptual models for design.

Limit Analysis and Concrete Plasticity Scientific Publishers

|| This book is intended to guide practicing structural engineers into more profitable routine designs with the AISC Load and Resistance Factor Design Specification (LRFD) for structural steel buildings. LRFD is a method of proportioning steel structures so that no applicable limit state is exceeded when the structure is subjected to all appropriate factored load combinations. Strength limit states are related to safety, and concern maximum load carrying capacity, Serviceability limit states are related to performance under service load conditions such as deflections. The term "resistance" includes both strength states and serviceability limit states. LRFD is a new approach to the design of structural steel for buildings. It involves explicit consideration of limit states, multiple load factors and resistance factors, and implicit probabilistic determination of reliability. The type of factoring used by LRFD differs from the allowable stress design of Chapters A through M of the 1989 Ninth Edition of the AISC Specifications for Allowable Stress Design, where only the resistance is divided by a factor of safety to obtain an allowable stress, and from the plastic design provisions of Chapter N, where the loads are multiplied by a common load factor of 1.7 for gravity loads and 1.3 for gravity loads acting with wind or seismic loads. LRFD offers the structural engineer greater flexibility, rationality, and economy than the previous 1989 Ninth Edition of the AISC Specifications for Allowable Stress Design.

Basic Principles of Concrete Structures McGraw-Hill Science, Engineering & Mathematics

This second edition of Precast Concrete Structures introduces the conceptual design ideas for the prefabrication of concrete structures and presents a number of worked examples that translate designs from BS 8110 to Eurocode EC2, before going into the detail of the design, manufacture, and construction of precast concrete multi-storey buildings. Detailed structural analysis of precast concrete and its use is provided and some details are presented of recent precast skeletal frames of up to forty storeys. The theory is supported by numerous worked examples to Eurocodes and European Product Standards for precast reinforced and prestressed concrete elements, composite construction, joints and connections and frame stability, together with extensive specifications for precast concrete structures. The book is extensively illustrated with over 500 photographs and line drawings.

Prestressed Concrete Design Elsevier

This revised, fully updated second edition covers the analysis, design, and construction of reinforced concrete structures from a real-world perspective. It examines different reinforced concrete elements such as slabs, beams, columns, foundations, basement and retaining walls and prestressed concrete incorporating the most up-to-date edition of the American Concrete Institute Code (ACI 318-14) requirements for the design of concrete structures. It includes a chapter on metric system in reinforced concrete design and construction. A new chapter on the design of formworks has been added which is of great value to students in the construction engineering programs along

with practicing engineers and architects. This second edition also includes a new appendix with color images illustrating various concrete construction practices, and well-designed buildings. The ACI 318-14 constitutes the most extensive reorganization of the code in the past 40 years. References to the various sections of the ACI 318-14 are provided throughout the book to facilitate its use by students and professionals. Aimed at architecture, building construction, and undergraduate engineering students, the scope of concepts in this volume emphasize simplified and practical methods in the analysis and design of reinforced concrete. This is distinct from advanced, graduate engineering texts, where treatment of the subject centers around the theoretical and mathematical aspects of design. As in the first edition, this book adopts a step-by-step approach to solving analysis and design problems in reinforced concrete. Using a highly graphical and interactive approach in its use of detailed images and self-experimentation exercises, "Concrete Structures, Second Edition," is tailored to the most practical questions and fundamental concepts of design of structures in reinforced concrete. The text stands as an ideal learning resource for civil engineering, building construction, and architecture students as well as a valuable reference for concrete structural design professionals in practice.

The Design of Reinforced Concrete Structures CRC Press

Structural Concrete: Theory and Design is a comprehensive new textbook that fills the gap between industrial and educational requirements by helping students understand the practical aspects of the modern design of concrete structures. M. Nadim Hassoun presents the analysis and design of both reinforced and prestressed concrete elements in an exceptionally logical and easy to read manner. Written to cover a two-course sequence on the design of reinforced concrete structures, this book should also serve as a valuable reference for the practicing engineer and those interested in concrete materials and design.

Design of Reinforced Concrete Structures for Architects Abhishek Publications

Prestressed concrete is widely used in the construction industry in buildings, bridges, and other structures. The new edition of this book provides up-to-date guidance on the detailed design of prestressed concrete structures according to the provisions of the latest preliminary version of Eurocode 2: Design of Concrete Structures, DD ENV 1992-1-1: 1992. The emphasis throughout is on design - the problem of providing a structure to fulfil a given purpose - but fundamental concepts are also described in detail. All major topics are dealt with, including prestressed flat slabs, an important and growing application in the design of buildings. The text is illustrated throughout with worked examples and problems for further study. Examples are given of computer spreadsheets for typical design calculations. Prestressed Concrete Design will be a valuable guide to practising engineers, students and research workers.

Failure, Distress and Repair of Concrete Structures CRC Press

First published in 1984, Limit Analysis and Concrete Plasticity explains for advanced design engineers the principles of plasticity theory and its application to the design of reinforced and prestressed concrete structures, providing a thorough understanding of the subject, rather than simply applying current design formulas. Updated and revised th

Precast Concrete Structures CRC Press

Understanding and recognising failure mechanisms in concrete is a fundamental pre-requisite to

determining the type of repair, or whether a repair is feasible. This title provides a review of concrete deterioration and damage, as well as looking at the problem of defects in concrete. It also discusses condition assessment and repair techniques. Part one discusses failure mechanisms in concrete and covers topics such as causes and mechanisms of deterioration in reinforced concrete, types of damage in concrete structures, types and causes of cracking and condition assessment of concrete structures. Part two reviews the repair of concrete structures with coverage of themes such as standards and guidelines for repairing concrete structures, methods of crack repair, repair materials, bonded concrete overlays, repairing and retrofitting concrete structures with fiber-reinforced polymers, patching deteriorated concrete structures and durability of repaired concrete. With its distinguished editor and international team of contributors, Failure and repair of concrete structures is a standard reference for civil engineers, architects and anyone working in the construction sector, as well as those concerned with ensuring the safety of concrete structures. Provides a review of concrete deterioration and damage Discusses condition assessment and repair techniques, standards and guidelines

Design of Concrete Structures CRC Press

Based on the latest version of designing codes both for buildings and bridges (GB50010-2010 and JTG D62-2004), this book starts from steel and concrete materials, whose properties are very important to the mechanical behavior of concrete structural members. Step by step, analysis of reinforced and prestressed concrete members under basic loading types (tension, compression, flexure, shearing and torsion) and environmental actions are introduced. The characteristic of the book that distinguishes it from other textbooks on concrete structures is that more emphasis has been laid on the basic theories of reinforced concrete and the application of the basic theories in design of new structures and analysis of existing structures. Examples and problems in each chapter are carefully designed to cover every important knowledge point. As a basic course for undergraduates majoring in civil engineering, this course is different from either the previously learnt mechanics courses or the design courses to be learnt. Compared with mechanics courses, the basic theories of reinforced concrete structures cannot be solely derived by theoretical analysis. And compared with design courses, this course emphasizes the introduction of basic theories rather than simply being a translation of design specifications. The book will focus on both the theoretical derivations and the engineering practices.

LooseLeaf for Design of Concrete Structures Springer Science & Business Media

Serviceability failures of concrete structures involving excessive cracking or deflection are relatively common, even in structures that comply with code requirements. This is often as a result of a failure to adequately account for the time-dependent deformations of concrete in the design of the structure. The serviceability provisions embodied in codes of practice are relatively crude and, in some situations, unreliable and do not adequately model the in-service behaviour of structures. In particular, they fail to adequately account for the effects of creep and shrinkage of the concrete. Design for serviceability is complicated by the non-linear and inelastic behaviour of concrete at service loads. Providing detailed information, this book helps engineers to rationally predict the time-varying deformation of concrete structures under typical in-service conditions. It gives analytical methods to help anticipate time-dependent cracking, the gradual change in tension

stiffening with time, creep induced deformations and the load independent strains caused by shrinkage and temperature changes. The calculation procedures are illustrated with many worked examples. A vital guide for practising engineers and advanced students of structural engineering on the design of concrete structures for serviceability and provides a penetrating insight into the time-dependent behaviour of reinforced and prestressed concrete structures.

Reinforced Concrete PHI Learning Pvt. Ltd.

Structural concrete members often show great deviation in structural performance from that predicted by the current code of practice. In certain cases the predictions considerably underestimate the capabilities of a structure or member, while in others the predictions are unsafe as they overestimate the member's ability to perform in a prescribed manner. Clearly, a rational and unified design methodology is still lacking for structural concrete. This book presents a simplified methodology based on calculations which are quick, easily programmable and no more complex than those required by the current codes. It involves identifying the regions of a structural member or structure through which the external load is transmitted from its point of application to the supports and then strengthening these regions as required. As most of these regions enclose the trajectories of internal compression actions the technique has been called the 'compressive force path' method. Ultimate limit-state design for concrete structures will provide designers with a practical and easily applied method for the design of a concrete structure, which is fully compatible with the behaviour of concrete (as described by valid experimental evidence) at both the material and structural level.

Time-Dependent Behaviour of Concrete Structures PHI Learning Pvt. Ltd.

Providing both an introduction to basic concepts and an in-depth treatment of the most up-to-date methods for the design and analysis of concrete of structures, "Design of Prestressed Concrete" will service the needs of both students and professional engineers.

DESIGN OF CONCRETE STRUCTURES John Wiley & Sons

this book include the following chapters: 1.Introduction 2.working stress method of design 3.shear, bond and development length 4. analysis and design of singly reinforced rectangular beams 5.analysis and design of doubly reinforced rectangular beams 6.design of one way slab 7.design of cantilever slab 8.design of circular slab 9.design of two way slab 10.design of singly and doubly reinforced T-beams 11.design of L-beams 12.design of continuous slabs 13.design of continuous beam 14.design of axially loaded RCC columns 15.isolated column footings and RCC footings for walls 16.design of stairs 17.design of corner balcony and coffer slab 18.limit state method 19.analysis and design of singly reinforced beam by limit state method 20.design of doubly reinforced beam by limit state method

Structural Concrete McGraw-Hill Education

Emphasizing a conceptual understanding of concrete design and analysis, this revised and updated edition builds the student's understanding by presenting design methods in an easy to understand manner supported with the use of numerous examples and problems.

Finite Element Design of Concrete Structures Thomas Telford

This new edition of a highly practical text gives a detailed presentation of the design of common reinforced concrete structures to limit state theory in accordance with BS 8110.

Design of Prestressed Concrete Thomas Telford

This book 'Design of Concrete Structures' in S.I. Units is based on working stress method as per code IS: 456-2000. All the chapters of the book have been revised and re-arranged in eight parts (32 thirty two chapters) separate aspects of design of one structural member have been described in different subsequent chapters. In addition to above (i) the service life of concrete structures, (ii)

Non-destructive tests/ Evaluation of strength (NDT/NDE) of materials and (iii) futuristic construction materials and Technique (FCMT) likely to be used for the concrete are new topics. Text for these topics (rarely, available in current books by other authors) have been first time given to familiarize the readers.