Timber, steel, and concrete are common engineering materials used in structural design. Material choice depends upon the type of structure, availability of material, and the preference of the designer. The design practices the code requirements of each material are very different. In this updated edition, the elemental designs of individual components of each material are presented, together with theory of structures essential for the design. Numerous examples of complete structural designs have been included. A comprehensive database comprising materials properties, section properties, specifications, and design aids, has been included to make this essential reading.

Many important advances in designing modern structures have occurred over the last several years. Structural engineers need an authoritative source of information that thoroughly and concisely covers the foundational principles of the field. Comprising chapters selected from the second edition of the best-selling Handbook of Structural Engineering, the book presents research papers presented by academicians, researchers, and practicing structural engineers from India and abroad in the recently held Structural Engineering Convention (SEC) 2014 at Indian Institute of Technology Delhi during 22 – 24 December 2014. The book is divided into three volumes and encompasses multidisciplinary areas within structural engineering, such as earthquake engineering and structural dynamics, structural mechanics, finite element methods, structural vibration control, advanced cementitious and composite materials, bridge engineering, and soil-structure interaction. Advances in Structural Engineering is a useful reference material for structural engineering fraternity including undergraduate and postgraduate students, academicians, researchers and practicing engineers. The design of structures in general, and prestressed concrete structures in particular, requires considerably more information than is contained in building codes. A sound understanding of structural behaviour at all stages of loading is essential. This textbook presents a detailed description and explanation of the behaviour of prestressed concrete members and structures both at service loads and at ultimate loads and, in doing so, provide a comprehensive and up-to-date guide to structural design. Much of the text is based on first principles and relies only on the principles of mechanics and the properties of concrete and steel, with numerous worked examples. However, where the design requirements and code specific, this book refers to the provisions of Eurocode 2: Design of Concrete Structures and, where possible, the notation is the same as in Eurocode 2. A parallel volume is written to the Australian Standard for Concrete Structures AS3600-2009. The text runs from an introduction to the fundamentals to in-depth treatments of more advanced topics in modern prestressed concrete structures. It suits senior undergraduate and graduate students and also practising engineers who want comprehensive introduction to the design of prestressed concrete structures. It retains the clear and concise explanations and the easy-to-read style of the first edition, but the content has been extensively re-organised and considerably expanded and updated. New chapters cover design procedures, actions and loads; prestressing systems and construction requirements; connections and detailing; and design concepts for prestressed concrete bridges. The topic of serviceability is developed extensively throughout. All the authors have been researching and teaching the behaviour and design of prestressed concrete structures for over thirty-five years and the proposed new edition of the book reflects this wealth of experience. The work has also gained much from Professor Gilbert active and long-time involvement in the development of standards for concrete buildings and concrete bridges.

Get the updated industry standard for a new age of construction! For more than fifty years, Olin's Construction has been the cornerstone reference in the field for architecture and construction professionals and students. This new edition is an invaluable resource that will provide in-depth coverage for decades to come. You'll find the most up-to-date principles, materials, methods, codes, and standards used in the design and construction of contemporary concrete, steel, masonry, and wood buildings for residential, commercial, and institutional use. Organized by the principles of the MasterFormat® 2010 Update, this edition: Covers sitework; concrete, steel, masonry, wood, and plastic materials; sound control; mechanical and electrical systems; doors and windows; finishes; industry standards; codes; barrier-free design; and much more Offers extensive coverage of the metric system of measurement Includes more than 1,800 illustrations, 175 new to this edition and more than 200 others, revised to bring them up to date Provides vital descriptive information on how to design buildings, detail components, specify materials and products, and avoid common pitfalls Contains new information on sustainability, expanded coverage of the principles of construction management and the place of construction managers in the construction process, and construction of long span structures in concrete, steel, and wood The most comprehensive text on the subject, Olin's Construction covers not only the materials and methods of building construction, but also building systems and equipment, utilities, properties of materials, and current design and contracting requirements. Whether you're a builder, designer, contractor, or manager, join the readers who have relied on the principles of Olin's Construction for more than two generations to master construction operations.

Discover BIM: A better way to build better buildings Building Information Modeling (BIM) offers a novel approach to design, construction, and facility management in which a digital representation of the building product and process is used to facilitate the exchange and interoperability of information in digital format. BIM is beginning to change the way buildings look, the way they function, and the ways in which they are designed and built. The BIM Handbook, Third Edition provides an in-depth understanding of BIM technologies, the business and organizational issues associated with its implementation, and the profound advantages that effective use of BIM can provide to all members of a project team. Updates to this edition include: Information on the ways in which professionals should use BIM to gain maximum value New topics such as collaborative working, national and major construction clients, BIM standards and guides A discussion on how various professional roles have expanded through the widespread use and the new avenues of BIM practices and services A wealth of new case studies that clearly illustrate exactly how BIM is applied in a wide variety of conditions Painting a colorful and thorough picture of the state of the art in building information modeling, the BIM...
Handbook, Third Edition guides readers to successful implementations, helping them to avoid needless frustration and costs and take full advantage of this paradigm-shifting approach to construct better buildings that consume fewer materials and require less time, labor, and capital resources.

Accompanying CD-ROM contains files that complement the text.

Continuing the tradition of the best-selling Handbook of Structural Engineering, this second edition is a comprehensive reference to the broad spectrum of structural engineering, encapsulating the theoretical, practical, and computational aspects of the field. The authors address a myriad of topics, covering both traditional and innovative approaches to analysis, design, and rehabilitation. The second edition has been expanded and reorganized to be more informative and cohesive. It also follows the developments that have emerged in the field since the previous edition, such as advanced analysis for structural design, performance-based design of earthquake-resistant structures, lifecycle evaluation and condition assessment of existing structures, the use of high-performance materials for construction, and design for safety. Additionally, the book includes numerous tables, charts, and equations, as well as extensive references, reading lists, and websites for further study or more in-depth information. Emphasizing practical applications and easy implementation, this text reflects the increasingly global nature of engineering, compiling the efforts of an international panel of experts from industry and academia. This is a necessity for anyone studying or practicing in the field of structural engineering. New to this edition Fundamental theories of structural dynamics Advanced analysis Wind and earthquake-resistant design Design of prestressed concrete, masonry, timber, and glass structures Properties, behavior, and use of high-performance steel, concrete, and fiber-reinforced polymers Semirigid frame structures Structural bracing Structural design for fire safety


This book presents articles from The Australasian Conference on the Mechanics of Structures and Materials (ACMSM25 held in Brisbane, December 2018), celebrating the 50th anniversary of the conference. First held in Sydney in 1967, it is one of the longest running conferences of its kind, taking place every 2–3 years in Australia or New Zealand. Bringing together international experts and leaders to disseminate recent research findings in the fields of structural mechanics, civil engineering and materials, it offers a forum for participants from around the world to review, discuss and present the latest developments in the broad discipline of mechanics and materials in civil engineering.

A user-friendly reference on the design and technology of building structures. The authors provide a holistic approach to structural design by covering all of the primary structural materials (steel, wood, reinforced concrete, and masonry) and combining architectural form, spatial organization, and load configurations.

Prepared by the Concrete Pole Task Committee of the Committee on Electrical Transmission Structures of the Structural Division of ASCE. This guide presents the proper procedures for the design, fabrication, inspection, testing, and installation of concrete poles. It outlines the information that a line designer should provide to the engineer who is designing the pole structure. It also suggests a suitable quality assurance program to ensure receipt of adequately designed and manufactured product. The guide addresses concrete poles that are spun or statically cast and that are prestressed, partially prestressed, or conventionally reinforced. This performance-oriented guide presents theories and methods that are generally recognized as good practice, but also allows for innovative and unique circumstances to be fully acceptable upon presentation of sufficient test data to demonstrate that proper performance can be achieved.

The Sixth Edition provides easy-to-follow design procedures, newly formatted numerical examples, and both new and updated design aids using ASCE 7-02, ACI 318-02, the third edition of the AISC Steel Manual and IBC 2003. It also includes new and updated information on 15 foot wide double tee load tables, seismic design, torsion and shear design, load and resistance factors, headed stud connection design, and fire resistance.

In 1994 fib Commission 6: Prefabrication edited a successful Planning and Design Handbook that ran to approximately 45,000 copies and was published in Spanish and German. Nearly 20 years later Bulletin 74 brings that first publication up to date. It offers a synthesis of the latest structural design knowledge about precast building structures against the background of 21st century technological innovations in materials, production and construction. With it, we hope to help architects and engineers achieve a full understanding of precast concrete building structures, the possibilities they offer and their specific design philosophy. It was principally written for non-seismic structures. The handbook contains eleven chapters, each dealing with a specific aspect of precast building structures. The first chapter of the handbook highlights best practice opportunities that will enable architects, design engineers and contractors to work together towards finding efficient solutions, which is something unique to precast concrete buildings. The second chapter offers basic design recommendations that take into account the possibilities, restrictions and advantages of precast concrete, along with its detailing, manufacture, transport, erection and serviceability stages. Chapter three describes the precast solutions for the most common types of buildings such as offices, sports stadiums, residential buildings, hotels, industrial warehouses and car parks. Different application possibilities are explored to teach us which types of precast units are commonly used in all those situations. Chapter four covers the basic design principles and systems related to stability. Precast concrete structures should be designed according to a specific stability concept, unlike cast in-situ structures. Chapter five discusses structural connections. Chapters six to nine address the four most commonly used systems or subsystems of precast concrete in buildings, namely, portal and skeletal structures, wall-frame structures, floor and roof structures and architectural concrete facades. In chapter ten the design and detailing of a number of specific construction details in precast elements are discussed, for example, supports, corbels, openings and cutouts in the units, special features related to the detailing of the reinforcement, and so forth. Chapter eleven gives guidelines for the fire design of precast concrete structures. The handbook concludes with a list of references to good literature on precast concrete construction.

This report from the second Strategic Highway Research Program (SHRP 2), which is administered by the Transportation Research Board of the National Academies, provides guidance on the design, fabrication, construction, and maintenance of precast concrete pavement (PCP) systems. It includes an assessment of the state of the practice for PCP technology as well as
guidelines for pavement selection, the decision-making process, and model specifications for PCP systems. This book was written with a dual purpose, as a reference book for practicing engineers and as a textbook for students of prestressed concrete. It represents the fifth generation of books on this subject written by its author. Significant additions and revisions have been made in this edition. Chapters 2 and 3 contain new material intended to assist the engineer in understanding factors affecting the time-dependent properties of the reinforcement and concrete used in prestressing concrete, as well as to facilitate the evaluation of their effects on prestress loss and deflection. Flexural strength, shear strength, and bond of prestressed concrete members were treated in a single chapter in the of flexural strength has third edition. Now, in the fourth edition, the treatment been expanded, with more emphasis on strain compatibility, and placed in Chapter 5 which is devoted to this subject alone. Chapter 6 of this edition, on flexural-shear strength, torsional strength, and bond of prestressed reinforce ment, was expanded to include discussions of Compression Field Theory and torsion that were not treated in the earlier editions. In similar fashion, expanded discussions of loss of prestress, deflection, and partial prestressing now are presented separately, in Chapter 7. Minor additions and revisions have been made to the material contained in the remaining chapters with the exception of xv xvi PREFACE Chapter 17. This chapter, which is devoted to construction considerations, has important new material on constructibility and tolerances as related to prestressed concrete. This volume presents the first half of a diverse collection of chapters in the field of materials and infrastructures in transport systems, which illustrate the technological and methodological innovations required to rise to the challenge of building more sustainable transport infrastructures for the future. The authors explore the potential of these sustainable solutions to improve the performance and efficiency of materials and infrastructures, with a reduced environmental impact and lower cost. Theoretical and practical case studies address a variety of topics including circular economy and sustainability, the impacts of climate change, durability, lifecycle, auscultation and the monitoring of infrastructures. This book provides transport researchers and professionals with a better understanding of the current and future trends in these innovative fields, enabling them to put into practice new technologies and methods of design and management, so that new solutions can become current practices to truly improve modern transport systems. Discover BIM: A better way to build better buildings. Building Information Modeling (BIM) is a new approach to design, construction, and facility management in which a digital representation of the building process is used to facilitate the exchange and interoperability of information in digital format. BIM is beginning to change the way buildings look, the way they function, and the ways in which they are designed and built. BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers, and Contractors provides an in–depth understanding of BIM technologies, the business and organizational issues associated with its implementation, and the profound advantages that effective use of BIM can provide to all members of a project team. The Handbook: Introduces Building Information Modeling and the technologies that support it Reviews BIM and its related technologies, in particular parametric and object–oriented modeling, its potential benefits, its costs, and needed infrastructure Explains how designing, constructing, and operating buildings with BIM differs from pursuing the same activities in the traditional way using drawings, whether paper or electronic Discusses the present and future influences of BIM on regulatory agencies; legal practice associated with the building industry; and manufacturers of building products Presents a rich set of BIM case studies and describes various BIM tools and technologies Shows how specific disciplines owners, designers, contractors, and fabricators can adopt and implement BIM in their companies Explores BIM's current and future impact on industry and society Painting a colorful and thorough picture of the state of the art in Building Information Modeling, the BIM Handbook guides readers to successful implementations, helping them to avoid needless frustration and costs and take full advantage of this paradigm–shifting approach to build better buildings, that consume fewer materials, and require less time, labor, and capital resources. The industry-standard guide to designing well-performing buildings Architectural Detailing systematically describes the principles by which good architectural details are designed. Principles are explained in brief, and backed by extensive illustrations that show you how to design details that will not leak water or air, will control the flow of heat and water vapor, will adjust to all kinds of movement, and will be easy to construct. This new third edition has been updated to conform to International Building Code 2012, and incorporates current knowledge about new material and construction technology. Sustainable design issues are integrated where relevant, and the discussion includes reviews of recent built works that extract underlying principles that can be the basis for new patterns or the alteration and addition to existing patterns. Regulatory topics are primarily focused on the US, but touch on other jurisdictions and geographic settings to give you a well-rounded perspective of the art and science of architectural detailing. In guiding a design from idea to reality, architects design a set of details that show how a structure will be put together. Good details are correct, complete, and provide accurate information to a wide variety of users. By demonstrating the use of detail patterns, this book teaches you how to design a building that will perform as well as you intend. Integrate appropriate detailing into your designs Learn the latest in materials, assemblies, and construction methods Incorporate sustainable design principles and current building codes Design buildings that perform well, age gracefully, and look great Architects understand that aesthetics are only a small fraction of good design, and that stability and functionality require a deep understanding of how things come together. Architectural Detailing helps you bring it all together with a well fleshed-out design that communicates accurately at all levels of the construction process. This document has a broad scope and is not focussed on design issues. Precast construction under seismic conditions is treated as a whole. The main principles of seismic design of different structural systems, their behavior and their construction techniques are presented through rules, construction steps and sequences, procedures, and details that should lead to precast structures built in seismic areas complying with the fundamental performance requirements of
collapse prevention and life safety in major earthquakes and limited damage in more frequent earthquakes. The content of this document is largely limited to conventional precast construction and, although some information is provided on the well-known “PRESSS technology” (jointed ductile dry connections), this latter solution is not treated in detail in this document. The general overview, contained in this document, of alternative structural systems and connection solutions available to achieve desired performance levels, intends to provide engineers, architects, clients, and end-users (in general) with a better appreciation of the wide range of applications that modern precast concrete technology can have in various types of construction from industrial to commercial as well as residential. Lastly, the emphasis on practical aspects, from conceptual design to connection detailing, aims to help engineers to move away from the habit of blindly following prescriptive codes in their design, but instead go back to basic principles, in order to achieve a more robust understanding, and thus control, of the seismic behaviour of the structural system as a whole, as well as of its components and individual connections.

This book should be of interest to construction site managers and supervisors; concrete technologist; testing organisations. It covers steel reinforcement, batching and mixing, readymix, handling and transporting, pumping, placing, curing, QC, precast, prestressed, special techniques, repair and some background mathematics.

This book presents a comprehensive approach towards the industrialization of building. It argues that only industrialization and automation can bring radical changes necessary to the building industry. "The BIM Handbook is an extensively researched and meticulously written book, showing evidence of years of work rather than something that has been quickly put together in the course of a few months. It brings together most of the current information about BIM, its history, as well as its potential future in one convenient place, and can serve as a handy reference book on BIM for anyone who is involved in the design, construction, and operation of buildings and needs to know about the technologies that support it. The need for such a book is indisputable, and it is terrific that Chuck Eastman and his team were able to step up to the plate and make it happen. Thanks to their efforts, anyone in the AEC industry looking for a deeper understanding of BIM now knows exactly where to look for it." —AECbytes book review, August 28, 2008 (www.aecbytes.com/review/2008/BIMHandbook.html) DISCOVER BIM: A BETTER WAY TO BUILD BETTER BUILDINGS Building Information Modeling (BIM) offers a novel approach to design, construction, and facility management in which a digital representation of the building process is used to facilitate the exchange and interoperability of information in digital format. BIM is beginning to change the way buildings look, the way they function, and the ways in which they are designed and built. The BIM Handbook, Second Edition provides an in-depth understanding of BIM technologies, the business and organizational issues associated with its implementation, and the profound advantages that effective use of BIM can provide to all members of a project team. Updates to this edition include: Completely updated material covering the current practice and technology in this fast-moving field Expanded coverage of lean construction and its use of BIM, with special focus on Integrated Project Delivery throughout the book New insight on the ways BIM facilitates sustainable building New information on interoperability schemas and collaboration tools Six new case studies Painting a colorful and thorough picture of the state of the art in building information modeling, the BIM Handbook, Second Edition guides readers to successful implementations, helping them to avoid needless frustration and costs and take full advantage of this paradigm-shifting approach to construct better buildings that consume fewer materials and require less time, labor, and capital resources.

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