Reinforced Concrete Column Design Using Excel Example

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Nonlinear Time Dependent Design and Analysis of Slender Reinforced Concrete Columns
Elements of Steel Reinforcement
Practical Design of Reinforced Concrete Structures
Reinforced Concrete Design
Reinforced Concrete Design Workflow to Eurocode 2
Reinforced Concrete Design
Reinforced Concrete: Mechanics and Design, Global Edition
A Study of Reinforced Concrete Column Design and Analysis
Structure for Architects
Reinforced Concrete Design to CP110

Reinforced Concrete Fundamentals
Structural Elements for Architects and Builders: Design of Columns, Beams, and Tension Elements in Wood, Steel, and Reinforced Concrete, 2nd Edition

KAELYN GATES

Reinforced Concrete Upper Saddle River, N.J. : Prentice Hall
Reinforced Concrete Design has been written to impart in-depth knowledge to students about the subject. The appropriate Indian standard guidelines, suitable illustrations, figures and solved numerical problems have been included. The design techniques used by the engineers have been discussed with suitable examples to provide basic knowledge to the readers. A sufficient number of questions are given at the end of each chapter to enable the students prepare for the examinations. An additional chapter explaining the concepts and applications of earthquake-resistant design of structures has been included in the text. The fundamentals of computer-aided design and drawing using suitable illustrations have been explained in the last chapter to enable the engineers to understand the practical applications of the subject. The book will serve the purpose of providing thorough knowledge to the students and practicing engineers in the subject. Salient features · Thorough understanding of design of reinforced concrete structures. · Knowledge of earthquake-resistant design of structures. · Computer-aided design fundamentals. · Analysis and design using STAAD · Drawing using AUTO CAD. · Illustrations containing reinforcement details. Contents: 1. Reinforced Concrete 2. Limit State Design 3. Limit State of Collapse – Flexure 4. Shear, Bond and Torsion 5. Limit State of Compression – Compression 6. Limit State of Serviceability 7. Design of Beams 8. Design of Slabs 9. Design of Stairs 10. Design of Foundations 11. Earthquake-Resistant Design of Structures 12. Computer-Aided Design of Structures About the Authors: Ravi Kumar Sharma, Professor in Civil Engineering Department, National Institute of Technology, Hamirpur (HP), obtained his PhD in 1999 from the Indian Institute of Technology, Roorkee. He is an experienced teacher, researcher and consultant with more than 35 years of experience. He has published 3 books, 125 research papers, completed 13 research projects and provided consultancy to more than 1500 construction projects. Rachit Sharma obtained his Masters degree in structural engineering from Guru Nanak Engineering College Ludhiana. He is currently pursuing research in structural engineering at National Institute of Technology Jalandhar. He has published 10 research papers in journals and conference proceedings.
INELASTIC DESIGN OF REINFORCED CRC Press
This highly successful book describes the background to the design principles, methods and procedures required in the design process for reinforced concrete structures. The easy to follow style makes it an ideal reference for students and professionals alike.
Simplified Design of Reinforced Concrete PUQ
The theory of reinforced concrete design is presented as a direct application of the laws of statics and behavior of reinforced concrete. This book emphasizes that a successful design must not only satisfy the design equations, but practical construction aspects as well. Covering basic undergraduate level concepts and more advanced topics, this book includes detailed treatments of flexure, shear, development and columns at a level suitable for undergraduate use, as well as the more difficult areas of strain compatibility solutions of beams, P-(Delta) analyses of frames, strut-and-tie models, and design for earthquake resistance. The numerous examples are all worked out completely, step-by-step.
Reinforced Concrete Design to BS 8110 Simply Explained BSP Books
Slender reinforced concrete columns have become widely used as structural members in recent years. Current Codes of Practice for Structural Concrete lack sufficient guidance to designers for their safe and efficient design. This investigation studies the behaviour of very slender, pin-ended, reinforced concrete columns, under short-term and sustained loads, by experiment and theoretical analysis. A new approach is used in the method of applying load to the column. A concentric axial load and independant primary end moments are considered. This allows the determination of secondary moments due to axial force and secondary deflections to be easily determined compared with the conventional eccentric load methods adopted in the past. A non-linear, second-order computer analysis has been developed which is capable of accurately predicting the deflections of hinged columns throughout the loading range from zero load to buckling failure, for any combination of eccentric loads and primary moments for short or sustained periods. It has the potential to accept end restraint in order to model framed columns. An extensive experimental programme of tests has been performed on 48 column specimens with slenderness ratios between 29 and 59 under short term loads and 5 specimens under sustained loads for up to two years. A total of 68 short column specimens with an identical section to the slender columns and material specimens were also tested. The specimens had a mean wet-cured cube strength of 42 N/sq.mm. The results of these tests and, 120 similar results of other authors, confirmed the validity of the proposed theoretical analysis and the assumptions used. The computer program which is presented could be made available to design offices for use on a basic micro-computer. The design methods recommended by three Codes of Practice, CP110:1972, ACI318:1977 and CP114:1957, have been compared with the experimental and theoretical results of this work. CP110 and ACI318 are shown to give conservative designs, with an overall load factor of 3.0 and 2.4 respectively, for design loads compared with the 25 year load.
Recommendations for Design of Beam-column Connections in Monolithic Reinforced Concrete Structures Routledge
This book provides design chart for circular columns with common size from 300mm to 2400mm diameter. These data serve as quick reference for structural engineer to determine the size of columns, effectively aid in preliminary design and construction cost estimation.
Stiffness Method in Reinforced Concrete Column Design CRC Press
This book is the companion volume to Design Examples for High Strength Steel Reinforced Concrete Columns – A Eurocode 4 Approach. Guidance is much needed on the design of high strength steel reinforced concrete (SRC) columns beyond the remit of Eurocode 4. Given the much narrower range of permitted concrete and steel material strengths in comparison to EC2 and EC3, and the better

ductility and buckling resistance of SRC columns compared to steel or reinforced concrete, there is a clear need for design beyond the guidelines. This book looks at the design of SRC columns using high strength concrete, high strength structural steel and high strength reinforcing steel materials – columns with concrete cylinder strength up to 90 N/mm2, yield strength of structural steel up to 690 N/mm2 and yield strength of reinforcing steel up to 600 N/mm2 respectively. The companion volume provides detailed worked examples on use of these high strength materials. This book is written primarily for structural engineers and designers who are familiar with basic EC4 design, and should also be useful to civil engineering undergraduate and graduate students who are studying composite steel concrete design and construction. Equations for design resistances are presented clearly so that they can be easily programmed into design spreadsheets for ease of use.

Reinforced Concrete Design Wiley-Interscience

Structure for Architects: A Case Study in Steel, Wood, and Reinforced Concrete Design is a sequel to the authors' first text, Structure for Architects: A Primer, emphasizing the conceptual understanding of structural design in simple language and terms. This book focuses on structural principles applied to the design of typical structural members—a beam, a girder, and a column—in a diagrammatic frame building. Through the application of a single Case Study across three key materials, the book illustrates the theory, principles, and process of structural design. The Case Study progresses step-by-step for each material, from determining tributary areas and loads through a member's selection and design. The book addresses the frequent disparity between the way architects and engineers perceive and process information, with engineers focusing on technical aspects and architects focusing on visual concepts. Structure for Architects: A Case Study in Steel, Wood, and Reinforced Concrete Design presents readers with an understanding of fundamental engineering principles through a uniquely thematic Case Study. Focusing on the conceptual understanding of structural design, this book will be of interest to architecture students and professionals looking to understand the application of structural principles in relation to steel, wood, and concrete design.

Reinforced Concrete Structures Tan Kar Chun

The updated version of this classic text explains the principles involved in the design of concrete structure buildings and summarizes the primary requirements of current building codes. Developed for self-study use as well as classroom instruction, this book requires little mathematical or engineering expertise. Example calculations are given for the practical design of contemporary structures.

Reinforced Concrete Column Design Program John Wiley & Sons

Reinforced Concrete Design: A Practical Approach, 2E is the only Canadian textbook which covers the design of reinforced concrete structural members in accordance with the CSA Standard A23.3-04 Design of Concrete Structures, including its 2005, 2007, and 2009 amendments, and the National Building Code of Canada 2010. Reinforced Concrete Design: A Practical Approach covers key topics for curriculum of undergraduate reinforced concrete design courses, and it is a useful learning resource for the students and a practical reference for design engineers. Since its original release in 2005 the book has been well received by readers from Canadian universities, colleges, and design offices. The authors have been commended for a simple and practical approach to the subject by students and course instructors. The book contains numerous design examples solved in a step-by-step format. The second edition is going to be available exclusively in hard cover version, and colours have been used to embellish the content and illustrations. This edition contains a new chapter on the design of two-way slabs and numerous revisions of the original manuscript. Design of two-way slabs is a challenging topic for engineering students and young engineers. The authors have made an effort to give a practical design perspective to this topic, and have focused on analysis and design approaches that are widely used in structural engineering practice. The topics include design of two-way slabs for flexure, shear, and deflection control. Comprehensive revisions were made to Chapter 4 to reflect the changes contained in the 2009 amendment to CSA A23.3-04. Chapters 6 and 7 have been revised to correct an oversight related to the transverse reinforcement spacing requirements in the previous edition of the book. Chapter 8 includes a new design example on slender columns and a few additional problems. Several errors and omissions (both text and illustrations) have also been corrected. More than 300 pages of the original book have been revised in this edition. Several supplements are included on the book web site. Readers will get time-limited access to the new column design software BPA COLUMN, which can generate column interaction diagrams for rectangular and cicrcular columns of variable dimensions and reinforcement amount. Additional supplements include spreadsheets related to foundation design and column load take down, and a few Power Point presentations showcasing reinforced concrete structures under construction and in completed form. Instructors will have an access to additional web site, which contains electronic version of the Instructor's Solution Manual with complete solutions to the end-of-chapter problems, and Power Point presentations containing all illustrations from the book. The book is a collaborative effort between an academic and a practising engineer and reflects their unique perspectives on the subject. Svetlana Brzev, Ph.D., P.Eng. is a faculty at the Civil Engineering Department of the British Columbia Institute of Technology, Burnaby, BC. She has over 25 years of combined teaching, research, and consulting experience related to structural design and rehabilitation of concrete and masonry structures, including buildings, municipal, and industrial facilities. John Pao, MEng, PEng, Struct.Eng, is the President of Bogdonov Pao Associates Ltd. of Vancouver, BC, and BPA Group of Companies with offices in Seattle and Los Angeles. Mr. Pao has extensive consulting experience related to design of reinforced concrete buildings, including high-rise residential and office buildings, shopping centers, parking garages, and institutional buildings.

Design of Reinforced Concrete Dearborn Trade Publishing

The objective of this guide is to provide comprehensive information on the design and detailing of reinforced concrete columns in buildings assigned to any Seismic Design Category. The design and detailing requirements in ACI 318-14 are clearly summarized in tables and figures for quick reference. Numerous design aids and flow charts are provided that can be used to determine the size of the cross-section and the required amounts of longitudinal and transverse reinforcement for members subjected to axial compression or combined flexure and axial compression. Slenderness effects are also covered, including methods on how to size a column so that such effects can be neglected. A collection of design strength interaction diagrams are given in an appendix that covers tied, rectangular columns ranging in size from 12 to 48 in.; tied and spiral circular columns ranging in diameter from 12 to 48 in.; Grade 60 and Grade 80 longitudinal reinforcement; concrete compressive strengths from 4,000 psi to 14,000 psi; and longitudinal reinforcement ratios from 1%

to less than 2.5%. Numerous worked-out examples illustrate the proper application of the code provisions and demonstrate the use of the design aids.

Design Examples for High Strength Steel Reinforced Concrete Columns Yfilios Solution

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 Handbook for Reinforced Concrete Elements Common Ground Publishing

This book focuses on the analysis and design of reinforced concrete structural members in conformity with the 2014 version of the CSA A23.3 Canadian standard. Such members are often encountered in practice, particularly in buildings. This second edition considers all the changes brought into the 2014 CSA A23.3 Canadian standard. In addition, with respect to the first edition, two new chapters related to the design of walls and of prestressed concrete structures are introduced. Using an original approach, the author presents the subject matter as clearly and effectively as possible. Each aspect is carefully illustrated and is the subject of a thorough theoretical development. This is followed by a step-by-step procedure for both design and verification, along with many fully developed numerical applications. This book is intended for practicing engineers as well as for students of that field. Engineers will find a valuable and concise reference which complements the standards and other engineering tools for their daily tasks. Students will use it as a textbook on reinforced concrete structures presented in an original and easy-to-use format.

Long Reinforced Concrete Columns CRC Press

This book was written to facilitate column sizing and reinforcement design for structural engineers. It arranges the design data in a clearly structured manner, and provides quick and easy ways for engineers to compare the feasibility of multiple alternatives (various column sizes and reinforcement configurations). With the help of this book, engineers can rapidly produce outputs for architects, which the latter can incorporate into their architectural layout plans. These outputs can also benefit quantity surveyors, especially for costing purposes, and help avoid careless design errors. The book is chiefly intended for structural engineers who implement Eurocode 2 for reinforced concrete design. To gain the most from it, readers should possess a basic understanding of column design, e.g. the stresses and forces produced in columns and their reinforcements when subjected to axial load and bending moment. However, the book also provides explanatory notes for the design data tables, allowing them to be used without prior background knowledge.

Comparison Study of Design Reinforced Concrete Column Using BS 8110 & EUROCODE 2 PHI Learning Pvt. Ltd.

The most up to date structural concrete text, with the latest ACI revisions Structural Concrete is the bestselling text on concrete structural design and analysis, providing the latest information and clear explanation in an easy to understand style. Newly updated to reflect the latest ACI 318-14 code, this sixth edition emphasizes a conceptual understanding of the subject, and builds the student's body of knowledge by presenting design methods alongside relevant standards and code. Numerous examples and practice problems help readers grasp the real-world application of the industry's best practices, with explanations and insight on the extensive ACI revision. Each chapter features examples using SI units and US-SI conversion factors, and SI unit design tables are included for reference. Exceptional weather-resistance and stability make concrete a preferred construction material for most parts of the world. For civil and structural engineering applications, rebar and steel beams are generally added during casting to provide additional support. Pre-cast concrete is becoming increasingly common, allowing better quality control, the use of special admixtures, and the production of innovative shapes that would be too complex to construct on site. This book provides complete guidance toward all aspects of reinforced concrete design, including the ACI revisions that address these new practices. Review the properties of reinforced concrete, with models for shrink and creep Understand shear, diagonal tension, axial loading, and torsion Learn planning considerations for reinforced beams and strut and tie Design retaining walls, footings, slender columns, stairs, and more The American Concrete Institute updates structural concrete code approximately every three years, and it's critical that students learn the most recent standards and best practices. Structural Concrete provides the most up to date information, with intuitive explanation and detailed guidance.

Reinforced Concrete Design Handbook John Wiley & Sons

This book is focused on the theoretical and practical design of reinforced concrete beams, columns and frame structures. It is based on an analytical approach of designing normal reinforced concrete structural elements that are compatible with most international design rules, including for instance the European design rules – Eurocode 2 – for reinforced concrete structures. The book tries to distinguish between what belongs to the structural design philosophy of such structural elements (related to strength of materials arguments) and what belongs to the design rule aspects associated with specific characteristic data (for the material or loading parameters). A previous book, entitled Reinforced Concrete Beams, Columns and Frames – Mechanics and Design, deals with the fundamental aspects of the mechanics and design of reinforced concrete in general, both related to the Serviceability Limit State (SLS) and the Ultimate Limit State (ULS), whereas the current book deals with more advanced ULS aspects, along with instability and second-order analysis aspects. Some recent research results including the use of non-local mechanics are also presented. This book is aimed at Masters-level students, engineers, researchers and teachers in the field of reinforced concrete design. Most of the books in this area are very practical or code-oriented, whereas this book is more theoretically based, using rigorous mathematics and mechanics tools. Contents 1. Advanced Design at Ultimate Limit State (ULS). 2. Slender Compression Members – Mechanics and Design. 3. Approximate Analysis Methods. Appendix 1. Cardano’s Method. Appendix 2. Steel Reinforcement Table. About the Authors Jostein Hellesland has been Professor of Structural Mechanics at the University of Oslo, Norway since January 1988. His contribution to the field of stability has been recognized and magnified by many high-quality papers in famous international journals such as Engineering Structures, Thin-Walled Structures, Journal of Constructional Steel Research and Journal of Structural Engineering. Noël Challamel is Professor in Civil Engineering at UBS, University of South Brittany in France and chairman of the EMI-ASCE Stability committee. His contributions mainly concern the dynamics, stability and inelastic behavior of structural components, with special emphasis on Continuum Damage Mechanics (more than 70 publications in International peer-reviewed journals). Charles Casandjian was formerly Associate Professor at INSA (French National Institute of Applied Sciences), Rennes, France and the chairman of the course on

reinforced concrete design. He has published work on the mechanics of concrete and is also involved in creating a web experience for teaching reinforced concrete design – BA-CORTEX. Christophe Lanos is Professor in Civil Engineering at the University of Rennes 1 in France. He has mainly published work on the mechanics of concrete, as well as other related subjects. He is also involved in creating a web experience for teaching reinforced concrete design – BA-CORTEX.

Structural Concrete Cuvillier Verlag

For courses in architecture and civil engineering. Reinforced Concrete: Mechanics and Design uses the theory of reinforced concrete design to teach students the basic scientific and artistic principles of civil engineering. The text takes a topic often introduced at the advanced level and makes it accessible to all audiences by building a foundation with core engineering concepts. The 7th Edition is up-to-date with the latest Building Code for Structural Concrete, giving students access to accurate information that can be applied outside of the classroom. Students are able to apply complicated engineering concepts to real world scenarios with in-text examples and practice problems in each chapter. With explanatory features throughout, the 7th Edition makes the reinforced concrete design a theory all engineers can learn from. The full text downloaded to your computer With eBooks you can: search for key concepts, words and phrases make highlights and notes as you study share your notes with friends eBooks are downloaded to your computer and accessible either offline through the Bookshelf (available as a free download), available online and also via the iPad and Android apps. Upon purchase, you'll gain instant access to this eBook. Time limit The eBooks products do not have an expiry date. You will continue to access your digital ebook products whilst you have your Bookshelf installed.

Slender Reinforced Concrete Columns Under Load and Moment University of Washington Press

Papers selected by the Reinforced Concrete Research Council of ASCE. This collection contains 13 papers reporting the results of a series of studies, begun in 1960, on the behavior of long reinforced concrete columns in frames. This report also includes additional studies limit design aspects of column and frame stability that were proposed in 1967. Findings from these studies, resulted in important changes in the slenderness provisions for reinforced concrete colums adopted in the 1983 American Concrete Institute building code.

Design of High Strength Steel Reinforced Concrete Columns CRC Press

Setting out design theory for concrete elements and structures and illustrating the practical applications of the theory, the third edition of this popular textbook has been extensively rewritten and expanded to conform to the latest versions of BS8110 and EC2. It includes more than sixty clearly worked out design examples and over 600 diagrams, plans and charts as well as giving the background to the British Standard and Eurocode to explain the ‘why’ as well as the ‘how’ and highlighting the differences between the codes. New chapters on prestressed concrete and water retaining structures are included and the most commonly encountered design problems in structural concrete are covered. Invaluable for students on civil engineering degree courses; explaining the principles of element design and the procedures for the design of concrete buildings, its breadth and depth of coverage also make it a useful reference tool for practising engineers.

Reinforced Concrete Pearson Higher Ed

Here is a comprehensive guide and reference to assist civil engineers preparing for the Structural Engineer Examination. It offers 350 pages of text and 70 design problems with complete step-by-step solutions. Topics covered: Materials for Reinforced Concrete; Limit State Principles; Flexure of Reinforced Concrete Beams; Shear and Torsion of Concrete Beams; Bond and Anchorage; Design of Reinforced Concrete Columns; Design of Reinforced Concrete Slabs and Footings; Retaining Walls; and Piled Foundations. An index is provided.

Eurocode 2 Design Data for Reinforced Concrete Columns Open Dissertation Press

This dissertation, "Inelastic Design of Reinforced Concrete Beams and Limited Ductile High-strength Concrete Columns" by Ching-ming, Johnny, Ho, □□□, was obtained from The University of Hong Kong (Pokfulam, Hong Kong) and is being sold pursuant to Creative Commons: Attribution 3.0 Hong Kong License. The content of this dissertation has not been altered in any way. We have altered the formatting in order to facilitate the ease of printing and reading of the dissertation. All rights not granted by the above license are retained by the author. Abstract: Abstract of thesis entitled INELASTIC DESIGN OF REINFORCED CONCRETE BEAMS AND LIMITED DUCTILE HIGH-STRENGTH CONCRETE COLUMNS submitted by Ho Ching Ming Johnny for the degree of Doctor of Philosophy at The University of Hong Kong in January 2003 This thesis studies the inelastic analysis and design of normal- and high-strength reinforced concrete beams and high-strength reinforced concrete columns. Particular attention is given to the proposed design method of limited ductile high-strength reinforced concrete columns. Analytical studies on normal- and high-strength reinforced concrete beams and experimental research on high-strength reinforced concrete columns are conducted and discussed. To investigate the post-peak behaviour and flexural ductility performance of reinforced concrete beams and columns, the author proposes a new method of rigorous nonlinear moment-curvature analysis that incorporates the strain history effect of tension steel. The moment-curvature curves derived using the new method resemble more closely the actual post-peak behaviour of reinforced concrete members compared to their conventionally-derived counterparts. The results enable the author to derive: (1) a theoretical equation that correlates the curvature ductility factor of reinforced concrete beams to various structural parameters; (2) two sets of design ultimate concrete strains suitable for use with either the proposed equivalent rectangular concrete stress block or the equivalent rectangular stress block of BS 8110; and (3) a series of design charts that facilitates the concurrent design of flexural strength and ductility of reinforced concrete beams. A new parametric study using the proposed analysis method is also conducted to refine the author's previously-proposed equation on transverse steel content of limited ductile high-strength reinforced concrete columns. A series of high-strength reinforced concrete columns containing transverse reinforcement calculated in accordance with this refined equation are tested under compressive axial load and reversed cyclic inelastic displacements to assess its adequacy. These columns prove capable of achieving a curvature ductility factor close to 10, which is the commonly-accepted measure for limited ductile structures. They are subsequently compared with another series of columns containing transverse steel calculated in accordance with the shear requirement of BS 8110. The performance of the latter series is shown to be much worse than the former in terms of flexural strength and ductility. The influence of transverse steel configuration is investigated on some test specimens selected from these two series of columns. In addition, three column specimens are tested to investigate the effect of tension steel lap splice. The test results indicate

that the lap splice should be located further away from the potential plastic hinge region. The author also proposes a rational evaluation of plastic hinge length, which could hitherto only be assessed empirically during experimental tests, using various methods that can be grouped into direct and indirect methods. The results are compared with the experimental data obtained from the majority of the column test specimens and with the experimental data obtained by other researchers, and they match closely. To facilitate the design of limited ductile hig