

# Columns

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**The Fifth Column** Andrew Gross 2019-09-10 "One of the best historical thriller authors in the business... [A] stellar novel." -Associated Press #1 New York Times bestselling author of The One Man Andrew Gross once again delivers a tense, stirring thriller of a family torn apart set against the backdrop of a nation plunged into war. February, 1939. Europe teeters on the brink of war. In New York City, twenty-two thousand cheering Nazi supporters pack Madison Square Garden for a raucous, hate-filled rally. In a Hell's Kitchen bar, Charles Mossman is reeling from the loss of his job and the demise of his marriage when a group draped in Nazi flags barges in. Drunk, Charlie takes a swing at one with tragic results and a torrent of unintended consequences follows. Two years later. America is wrestling with whether to enter the growing war. Charles's estranged wife and six-year-old daughter, Emma, now live in a quiet brownstone in the German-speaking New York City neighborhood of Yorkville, where support for Hitler is common. Charles, just out of prison, struggles to put his life back together, while across the hall from his family, a kindly Swiss couple, Trudi and Willi Bauer, have taken a liking to Emma. But Charles begins to suspect that they might not be who they say they are. As the threat of war grows, and fears of a "fifth column"-German spies embedded into everyday life-are everywhere, Charles puts together that the seemingly amiable Bauers may be part of a sinister conspiracy. When Pearl Harbor is attacked and America can no longer sit on the sideline, that conspiracy turns into a deadly threat with Charles the only one who can see it and Emma, an innocent pawn.

**Seismic Assessment and Retrofit of Reinforced Concrete Columns** Konstantinos G. Megalooikonomou 2019-02-27 Reinforced concrete columns play a very important role in structural performance. As such, it is essential to apply a suitable analytical tool to estimate their structural behaviour considering all failure mechanisms such as axial, shear, and flexural failures. This book highlights the development of a fiber beam-column element accounting for shear effects and the effect of tension stiffening through reinforcement-to-concrete bond, along with the employment of suitable constitutive material laws.

**Fluid Dynamics of Packed Columns** Jerzy Mackowiak 2009-12-10 The first German edition of the book "Fluid dynamics of packed columns with modern random and structured packings for gas/liquid systems" was published in 1991. It sold out within a few years. Added to this were numerous enquiries, in particular within the industry, prompting me to publish a second, extended edition. A packed column remains the core element of any diffusional separation process. This underlines the need for basic design principles for packed columns, which enhance the design process by making it more accurate and reliable. The SBD (suspended bed of droplets) model introduced in the first German edition of the book was well received by the experts and is now used by a large number of companies in the industry, as it offers improved reliability in the fluid dynamic design of packed columns. For the purpose of facilitating the design process, the SBD model was integrated into the simulation programme ChemCAD. The software programme FDPACK, which is available for Windows, has certainly contributed to the widespread use of the SBD model. The programme is very user-friendly and the calculation results are presented in tabular as well as graphic form, showing good load, pressure drop and hold-up diagrams in the entire operating range.

**Evaluation of Packed Distillation Columns** Thaine W. Reynolds 1951 The evaluation indicated that of packings used in glass distillation columns, Heli-Grid was most efficient and of packings used in steel distillation columns, steel helices were most efficient.

**Chemical Analysis** Raymond Peter William Scott 1941

**Tray Efficiencies in Distillation Columns** American Institute of Chemical Engineers. Research Committee 1958

**Microbore Column Chromatography** F. J. Yang 2020-08-26 This book describes the various aspects of microbore column chromatography. It provides readers with an in-depth understanding of the supercritical fluid chromatography and microbore high-performance liquid chromatography.

**Cache conscious column organization in in-memory column stores** David Schwalb 2013

**Geosynthetic Encased Columns for Soft Soil Improvement** Márcio Almeida 2018-10-10 The geosynthetic encased column (GEC) is a relatively recent method developed for soft soil improvement. The method was firstly introduced as a concept in the 1980s and first practical applications started in the 1990s. GECs have been widely used in some parts of the world for the last three decades. However, there is no book in the literature summarizing the knowledge accumulated during this period in relation to this soft ground improvement technique. The purpose of this book is to provide readers with the GEC fundamentals and practical applications. Chapter 1 presents the general principles of this ground improvement technique including the methods used for GEC installation and how the material properties may be selected. Chapter 2 presents the design methods, thus settlement calculations by means of analytical methods and stability calculations by limit equilibrium methods are explained in detail. Chapter 3 presents calculation examples illustrating the usual steps to be done for both service limit state and ultimate limit state designs. Then field performances exemplifying practical applications of the GEC technique are presented in Chapter 4 for some case histories. Following numerical analyses, often used in design to complement analytical methods, are presented in Chapter 5. Annexes I and II at the end contain the charts developed to perform settlement calculations. The book combines the experiences of four authors with different academic and industry backgrounds to describe GEC design and performance. It is aimed at civil engineers in general, particularly geotechnical engineers, either working in design or in practice, at graduate students, and at senior undergraduate students.

**Compressive Strength of Column Web Plates and Wide Web Columns (Classic Reprint)**

Robert S. Johnston 2017-10-28 Excerpt from Compressive Strength of Column Web Plates and Wide Web Columns The investigation reported in this paper was initiated by the Delaware River Bridge Joint Commission. Its purpose was three fold: (1) To study the relation between the thickness of plate and unsupported widths of plate for compression members with particular reference to the validity of a commonly accepted structural designing rule as applied to high-strength steel; (2) to determine the ultimate strength of laterally supported wide web column sections of silicon manganese steel of the type adopted by the commission for the towers of the Delaware River Suspension Bridge with particular reference to the factors that determine the strength of such columns; (3) to compare the action of webs of two thin plates stitch - riveted together, with a single thick plate web of equal thickness. After consultation between the Bureau of Standards and the Delaware

River Bridge Joint Commission the dimensions Of the test specimens and the general test procedure were decided upon and the column sections ordered and forwarded to the bureau for test. The sections tested were full size tower section elements and represented the tower portions indicated in Figure 10. About the Publisher Forgotten Books publishes hundreds of thousands of rare and classic books. Find more at [www.forgottenbooks.com](http://www.forgottenbooks.com) This book is a reproduction of an important historical work. Forgotten Books uses state-of-the-art technology to digitally reconstruct the work, preserving the original format whilst repairing imperfections present in the aged copy. In rare cases, an imperfection in the original, such as a blemish or missing page, may be replicated in our edition. We do, however, repair the vast majority of imperfections successfully; any imperfections that remain are intentionally left to preserve the state of such historical works.

**White Columns in Hollywood** Susan Myrick 1994-06 Originally published in the Macon Telegraph and Atlanta Georgian, these lively reports on the filming of *Gone With the Wind* are enhanced by photographs, including some by the journalist/GWTW technical adviser herself.

Ordonnance for the Five Kinds of Columns after the Method of the Ancients Claude Perrault 1996-08-22 Perrault argues that rules of architecture be determined by reason, not by ancient precedent.

*The Parent Trap Columns* Michael A. Battey 2017-06-30 "The Parent Trap Columns, Volume 1, is the first in a two-volume collection of humorous and insightful observations on contemporary teen parenting by Michael A. Battey, an East Greenwich, Rhode Island based doctor. Published in community newspapers within Rhode Island over several years, the columns reflect the author's personal experience along with commentary on parenting trends, and public education." -- Reiser's Ramblings Bernard Reiser 2010-06-13 A collection of the best columns written over the past three decades by Fr. Bernard Reiser, founding pastor of Epiphany Catholic Church in Coon Rapids, Archdiocese of Saint Paul and Minneapolis, MN. Read about Fr. Reiser's take on everyday topics such as family, kindness, gratitude, prayer, helping others, and staying focused on what's important in life. Fr. Reiser's essays are rich in symbolism, wise in understanding of human nature, and fruitful in explicating the word of God. Father is a master in the art of spiritual storytelling; he engages, entertains, and challenges with undeniable hope. He has a gift and he shares it generously in this lovely book. Included are stories with the deep conviction that our human journey and our spiritual journey are intrinsically linked. He shares observations that are sometimes so wondrously obvious and visible, and he does it in a way that feels like you're hearing from a close friend. It becomes clear as you page through Reiser's Ramblings that Fr. Reiser clearly loves his vocation as a priest and delights in sharing his years of study and the fruits of his prayer with the reader. Fr. Reiser opens up the Scripture in familiar language, stories, and metaphors that are accessible to the ordinary person in the pew. How uplifting and inspiring to hear the Gospel woven with from Father's personal life experiences! All profits from the sale of Reiser's Ramblings go to Haitian relief efforts sponsored by Reiser Relief Inc. ([ReiserRelief.org](http://ReiserRelief.org))

*Dynamics and Control of Chemical Reactors, Distillation Columns, and Batch Processes (DYCORD+ '92)* International Federation of Automatic Control 1993 Hardbound. In addition to the three main themes: chemical reactors, distillation columns, and batch processes this volume also addresses some of the new trends in dynamics and control methodology such as model based predictive control, new methods for identification of dynamic models, nonlinear control theory and the application of neural networks to identification and control. Provides a useful reference source of the major advances in the field.

**A Theory for Industrial Gas-liquid Chromatographic Columns** Robert Henry Houston 1958

**M** Mirako Press 2018-05-07 Professional Appointment Agenda - Appointment Schedule Book - Appointment Scheduler Calendar Are you looking for a tool to assist you more wisely and efficiently in managing projects and appointments? This Daily

Appointment Notebook is the best choice! Cover: Great tough matte paperback. Secure professional binding prevents the paper falling apart. Therefore, the ledge is durable to withstand any adventure Dimensions: Measures 8.5 x 11 inches, almost the same width as A4 but shorter in height. It is perfect size for any workspace look tidy! Interior Details: This convenient Notebook has 110 pages with thick, high-quality white paper to prevent ink leakage. On each pages of the Appointment Log Book, there are 4 columns with appointment times from 7AM to 9PM in 15 minute increments. At the back, a section is also included to write important contact details. The columns are clearly marked to make an appointment time / date very easy to cross reference Suitable for pencils, pens, felt tips pens and acrylic pens Simple design interior What is this book for? This Daily Appointment Schedule will help you to organize the appointments in orders with our great value range of client appointment books. You can use this Appointment Planner as a personal reminder to increase your productivity Who will need this book? This Daily Appointment Notebook is the best solution for those who deal with managing projects, clients and appointments or want to organize their daily grind wisely and professionally We stand for high quality, beautiful design, affordable price and plentiful choices through our wide range of notebooks to ensure you have amazing experience with your journals!! Have a good time!

**Tests of Large Columns with H-Shaped Sections (Classic Reprint)** L. B. Tuckerman 2017-10-28 Excerpt from Tests of Large Columns With H-Shaped Sections The Bureau of Standards, in cooperation with the American Bridge co. Undertook, therefore, a study of a limited number (39) of larger columns, here called the first series, designed to compare the behaviors Of light and heavy columns of similar cross section. It was further desired to compare the strengths of riveted' columns fabricated in the ordinary manner Of plates and angles with similar solid rolled sections of the same section area, radius of gyration, length, and Of similar material As the previous tests had indicated that the properties of the steel influenced in a large degree the behavior of the columns, a series of 85 tensile test coupons were cut from the material of the columns and tested for yield point (by drop of beam), tensile strength and elongation, and) chemical analyses: were made from each coupon. Later 42 supplementary coupons were cut from some of the material and tested. About the Publisher Forgotten Books publishes hundreds of thousands of rare and classic books. Find more at [www.forgottenbooks.com](http://www.forgottenbooks.com) This book is a reproduction of an important historical work. Forgotten Books uses state-of-the-art technology to digitally reconstruct the work, preserving the original format whilst repairing imperfections present in the aged copy. In rare cases, an imperfection in the original, such as a blemish or missing page, may be replicated in our edition. We do, however, repair the vast majority of imperfections successfully; any imperfections that remain are intentionally left to preserve the state of such historical works.

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a good time!

**M** Mirako Press 2018-05-10 Appointment Agenda - Appointment Schedule Book - Appointment Scheduler Calendar How many times in a year do you estimate you forget an appointment? Let this stylist appointment booklet help you and your business organized and on schedule. As a patron, the honest mistake of missing an appointment can be overlooked, but not as a business owner. Missed appointments are missed opportunities for income and repeat customers. This appointment book is an essential time-management tool whether you are you are freelancing or managing a hair salon Cover: Great tough matte paperback. Secure professional binding prevents the paper falling apart. Therefore, the ledge is durable to withstand any adventure Dimensions: Measures 8.5 x 11 inches, almost the same width as A4 but shorter in height. It is perfect size for any workspace look tidy! Interior Details: This convenient Notebook has 110 pages with thick, high-quality white paper to prevent ink leakage. On each pages of the Appointment Log Book, there are 7 columns from Monday to Sunday with appointment times from 7AM to 9PM in 15 minute increments. At the back, a section is also included to write important contact details. The columns are clearly marked to make an appointment time / date very easy to cross reference Suitable for pencils, pens, felt tips pens and acrylic pens Simple design interior What is this book for? This Daily Appointment Schedule will help you to more control the appointment scheduling. This Appointment Planner releases you from the headache of the process of appointment confirmation such as rescheduling for no-show or last minute cancellations. It will help your business have an effective appointment schedule. Who will need this book? This Daily Appointment Notebook is perfect for hairdressers and beauty salons, our appointment books are available in a range of styles depending on your exact requirements. We stand for high quality, beautiful design, affordable price and plentiful choices through our wide range of notebooks to ensure you have amazing experience with your journals!! Have a good time!

*The Story of the Iron Column* Abel Paz 2011 A passionate history of fighting against all odds—the legendary war against fascism and capitalism in Spain.

**Seismic Behavior of Deep, Slender Wide-Flange Structural Steel Beam-columns**

Piyachai Chansuk 2018 This thesis investigates nonlinear cyclic responses of deep wide-flange steel beam-columns, which are primarily used in Special Moment Frame (SMF) for their high in-plane, strong-axis moment of inertia to satisfy story drift limits specified in building codes. SMF design principles aim to achieve energy dissipation through plastic hinging of the beams, while flexural yielding of the columns at the base is also permitted. Although behavior of the beams has been extensively researched, that of the columns is lacking especially for deep columns (e.g., W18 to W36). Therefore, cyclic testing of deep columns was conducted to generate experimental database. Due to large width-to-thickness ratios of these sections, test results showed significant web and flange local buckling; some specimens also exhibited lateral-torsional buckling. These local and global instabilities resulted in significant axial shortening and flexural strength degradation. These behaviors differ significantly from those observed in prior testing of shallow W14 columns, featuring excellent ductility capacity at high axial loads. Additionally, the test matrix was designed to investigate the effects of section depths, varying axial loads, lateral-drift loading sequences, and boundary conditions on the column responses. Inevitably in this testing, the responses were also influenced by flexibility of column-end connections. To eliminate this undesired variable from the responses, a procedure was developed to correct the lateral drift response based on the second-order Timoshenko elastic theory. The effects of boundary conditions were further investigated using high-fidelity finite element software ABAQUS. Results show that fixed-fixed and fixed-rotating column responses can be converted to one another.

**P** Mirako Press 2018-05-10 Appointment Agenda - Appointment Schedule Book - Appointment Scheduler Calendar How many times in a year do you estimate you forget an appointment? Let this stylist appointment booklet help you and your business organized and on schedule. As a patron, the honest mistake of missing an appointment can be overlooked, but not as a business owner. Missed appointments

are missed opportunities for income and repeat customers. This appointment book is an essential time-management tool whether you are you are freelancing or managing a hair salon Cover: Great tough matte paperback. Secure professional binding prevents the paper falling apart. Therefore, the ledge is durable to withstand any adventure Dimensions: Measures 8.5 x 11 inches, almost the same width as A4 but shorter in height. It is perfect size for any workspace look tidy! Interior Details: This convenient Notebook has 110 pages with thick, high-quality white paper to prevent ink leakage. On each pages of the Appointment Log Book, there are 7 columns from Monday to Sunday with appointment times from 7AM to 9PM in 15 minute increments. At the back, a section is also included to write important contact details. The columns are clearly marked to make an appointment time / date very easy to cross reference Suitable for pencils, pens, felt tips pens and acrylic pens Simple design interior What is this book for? This Daily Appointment Schedule will help you to more control the appointment scheduling. This Appointment Planner releases you from the headache of the process of appointment confirmation such as rescheduling for no-show or last minute cancellations. It will help your business have an effective appointment schedule. Who will need this book? This Daily Appointment Notebook is perfect for hairdressers and beauty salons, our appointment books are available in a range of styles depending on your exact requirements. We stand for high quality, beautiful design, affordable price and plentiful choices through our wide range of notebooks to ensure you have amazing experience with your journals!! Have a good time!

**K** Mirako Press 2018-05-20 Automotive Appointment Agenda - Appointment Schedule Book - Appointment Scheduler Calendar There is nothing more important though than filling up your calendar with clients. An appointment book is essential tool for any kind of appointment-based business, and mechanic shops are not exclusive. This right appointment notebook will make it easier for you and your business to run smoothly and on schedule. Cover: Great tough matte paperback. Secure professional binding prevents the paper falling apart. Therefore, the ledge is durable to withstand any adventure Dimensions: Measures 8.5 x 11 inches, almost the same width as A4 but shorter in height. It is perfect size for any workspace look tidy! Interior Details: This convenient Notebook has 110 pages with thick, high-quality white paper to prevent ink leakage. On each pages of the Appointment Log Book, there are 7 columns from Monday to Sunday with appointment times from 7AM to 9PM in 15 minute increments. At the back, a section is also included to write important contact details. The columns are clearly marked to make an appointment time / date very easy to cross reference Suitable for pencils, pens, felt tips pens and acrylic pens Simple design interior What is this book for? This Daily Appointment Schedule will help you to more control the appointment scheduling. This Appointment Planner releases you from the headache of the process of appointment confirmation such as rescheduling for no-show or last minute cancellations. It will help your business have an effective appointment schedule. Who will need this book? This Daily Appointment Notebook is perfect for hairdressers and beauty salons, our appointment books are available in a range of styles depending on your exact requirements. We stand for high quality, beautiful design, affordable price and plentiful choices through our wide range of notebooks to ensure you have amazing experience with your journals!! Have a good time!

**The Column of Antoninus Pius** Lise Vogel 1973 Shortly after the death in 161 of Antoninus Pius, his sons dedicated a column to him as a funerary monument. The form of the column in general and the reliefs on the pedestal in particular raise problems central to the understanding of Roman art. In this first thorough study, illustrated with nearly 100 photographs, Lise Vogel restores the column to its rightful place as one of the major monuments of Roman art. In addition, she re-evaluates the meaning of the column of Antoninus Pius in the context of the development of second century Roman imperial sculpture.

Tests of Large Timber Columns and Presentation of the Forest Products Laboratory Column Formula John A. Newlin 1930

**Columns by Ultimate Strength Design, Including Square Footings** Concrete Reinforcing Steel Institute. Engineering Practice Committee 1967

**The Seismic Response of Well-confined Circular Reinforced Concrete Columns with Low Aspect Ratios** Ngan Ha D. Vu 1999

**The LEGO Architecture Idea Book** Alice Finch 2018-09-25 Take your creations to the next level with The LEGO Architecture Idea Book! These clever building tips will give you endless inspiration for making your own amazing mansions, castles, houses, spooky shacks, and more. Every chapter includes ideas for creating architectural elements like columns, doors, windows, and walls. But rather than providing step-by-step instructions, the book includes helpful photography from every angle that shows you how to achieve the look, adapt it to your build, and make it your own. Learn how to: - Build amazing walls that break the mold, with brick-and-mortar effects, weathered walls, and loose bricks - Recreate structural effects like timber framing, soaring towers and turrets, shingled roofs, clapboard siding, and more - Elevate your models with "stained glass", intricate color patterns, and tumble-down wear-and-tear - Use pieces like croissants, snakes, and goblets to make unique architectural ornamentation Bursting with clever ideas, The LEGO Architecture Idea Book will show you how to turn your buildings into impressive, realistic structures.

**P Mirako Press 2018-05-18 Barber Appointment Agenda - Appointment Schedule Book - Appointment Scheduler Calendar** Are you looking for a tool to assist you to organize the appointments of your busy salon, or simply manage your salon business more efficiently? This Daily Appointment Notebook is perfect for you!! Cover: Great tough matte paperback. Secure professional binding prevents the paper falling apart. Therefore, the ledge is durable to withstand any adventure Dimensions: Measures 8.5 x 11 inches, almost the same width as A4 but shorter in height. It is perfect size for any workspace look tidy! Interior Details: This convenient Notebook has 110 pages with thick, high-quality white paper to prevent ink leakage. On each pages of the Appointment Log Book, there are 7 columns from Monday to Sunday with appointment times from 7AM to 9PM in 15 minute increments. At the back, a section is also included to write important contact details. The columns are clearly marked to make an appointment time / date very easy to cross reference Suitable for pencils, pens, felt tips pens and acrylic pens Simple design interior What is this book for? This Daily Appointment Schedule will help you to more control the appointment scheduling. This Appointment Planner releases you from the headache of the process of appointment confirmation such as rescheduling for no-show or last minute cancellations. It will help your business have an effective appointment schedule. Who will need this book? This Daily Appointment Notebook is perfect for hairdressers and beauty salons, our appointment books are available in a range of styles depending on your exact requirements. We stand for high quality, beautiful design, affordable price and plentiful choices through our wide range of notebooks to ensure you have amazing experience with your journals!! Have a good time!

**White Columns in Georgia** Medora Field Perkerson 2021-09-09 This work has been selected by scholars as being culturally important and is part of the knowledge base of civilization as we know it. This work is in the public domain in the United States of America, and possibly other nations. Within the United States, you may freely copy and distribute this work, as no entity (individual or corporate) has a copyright on the body of the work. Scholars believe, and we concur, that this work is important enough to be preserved, reproduced, and made generally available to the public. To ensure a quality reading experience, this work has been proofread and republished using a format that seamlessly blends the original graphical elements with text in an easy-to-read typeface. We appreciate your support of the preservation process, and thank you for being an important part of keeping this knowledge alive and relevant.

**Stability and Dynamic Analysis of a Slender Column with Curved Longitudinal Stiffeners** Mark S. Lake 1989

**Told You So** Ralph Nader 2013-05-28 "What sets Ralph Nader apart is that he has moved beyond social criticism to effective political action." -The New York Times The column is the most natural literary form for a citizen's advocate, and Ralph Nader may be its most robust and forceful practitioner. The Big Book of Ralph

Nader Columns presents a panoramic portrait of the problems confronting our society and provides examples of the many actions an organized citizenry could and should take to create a more just and environmentally sustainable world. Drawing on decades of experience, Nader's columns document the consequences of concentrated corporate power; threats to our food, water and air; the corrosive effect of commercialism on our children; the dismantling of worker rights; and the attacks on our civil rights and civil liberties. Nader also offers concrete suggestions to spark citizen action and achieve social change.

**Evaluation of Fiberglass Wrapped Concrete Bridge Columns** Dante Fratta 2008 The main purpose of this project was to assess the effectiveness of fiberglass wrappings in reducing the corrosion degradation rate of concrete bridge columns. To evaluate the effectiveness of the technique, the research team used both nondestructive and destructive test methods. The results of the study show that the wrappings, while protecting the columns from further ingress of chloride ions, do not help deter corrosion activity when it is already present. Recommendations for the future use of fiber wraps, complemented with other remediation techniques and maintenance practices, are provided.

**Columns for Gas Chromatography** Eugene F. Barry, PhD 2007-04-27 Choosing the right column is key in Gas Chromatography Gas Chromatography (GC) is the most widely used method for separating and analyzing a wide variety of organic compounds and gases. There have been many recent advancements in both packed column and capillary column GC. With numerous options and considerations, selecting the right column can be complicated. This resource provides essential guidance for scientists and technicians, including: Methods of choosing both capillary and packed columns Selection of dimensions (column length, I.D., film thickness, etc.) and type of column Guidelines for proper connections of the column to the injector and detector United States Pharmacopeia and National Formulary chromatographic methods ASTM, EPA, NIOSH, and OSHA column selection specifications Information on the advantages of computer assistance in GC and multidimensional GC Comprehensive information on column oven temperature control Columns for Gas Chromatography: Performance and Selection is a hands-on reference for scientists and technicians using GC.

**Ledger Book** Elegant Simple Trackers 2019-06-23 This Ledger book is great for tracking finances and transactions. It can be used for personal, small business or for home-based businesses. This book includes date, description, account, income, expenses and Totals. 110 pages and size of the book is 7.4 inch x 9.7 inch. Simple book for recording transactions.

**Concrete-Filled Stainless Steel Tubular Columns** Vipulkumar Patel 2018-12-07 Concrete-filled stainless steel tubular (CFSST) columns are increasingly used in modern composite construction due to their high strength, high ductility, high corrosion resistance, high durability and aesthetics and ease of maintenance. Thin-walled CFSST columns are characterized by the different strain-hardening behavior of stainless steel in tension and in compression, local buckling of stainless steel tubes and concrete confinement. Design codes and numerical models often overestimate or underestimate the ultimate strengths of CFSST columns. This book presents accurate and efficient computational models for the nonlinear inelastic analysis and design of CFSST short and slender columns under axial load and biaxial bending. The effects of different strain-hardening characteristics of stainless steel in tension and in compression, progressive local and post-local buckling of stainless steel tubes and concrete confinement are taken into account in the computational models. The numerical models simulate the axial load-strain behavior, moment-curvature curves, axial load-deflection responses and axial load-moment strength interaction diagrams of CFSST columns. The book describes the mathematical formulations, computational procedures and model verifications for circular and rectangular CFSST short and slender columns. The behavior of CFSST columns under various loading conditions is demonstrated by numerous numerical examples. This book is written for practising structural and civil engineers, academic researchers and graduate students in civil engineering who are interested in the latest computational techniques and design methods for CFSST columns.

*Column Generation* Guy Desaulniers 2006-03-20 Column Generation is an insightful overview of the state of the art in integer programming column generation and its many applications. The volume begins with "A Primer in Column Generation" which outlines the theory and ideas necessary to solve large-scale practical problems, illustrated with a variety of examples. Other chapters follow this introduction on "Shortest Path Problems with Resource Constraints," "Vehicle Routing Problem with Time Window," "Branch-and-Price Heuristics," "Cutting Stock Problems," each dealing with methodological aspects of the field. Three chapters deal with transportation applications: "Large-scale Models in the Airline Industry," "Robust Inventory Ship Routing by Column Generation," and "Ship Scheduling with Recurring Visits and Visit Separation Requirements." Production is the focus of another three chapters: "Combining Column Generation and Lagrangian Relaxation," "Dantzig-Wolfe Decomposition for Job Shop Scheduling," and "Applying Column Generation to Machine Scheduling." The final chapter by François Vanderbeck, "Implementing Mixed Integer Column Generation," reviews how to set-up the Dantzig-Wolfe reformulation, adapt standard MIP techniques to the column generation context (branching, preprocessing, primal heuristics), and deal with specific column generation issues (initialization, stabilization, column management strategies).

Cyclic Behavior and Design of Steel Columns Subjected to Large Drift James David Newell 2008 During an earthquake, steel braced frame columns are potentially subjected to high axial forces combined with inelastic rotation demand resulting from lateral story drift. Little design guidance is available concerning the reliability of steel columns under this level of combined loading. To evaluate the performance of wide-flange columns under high axial load and drift demand, specimens have been subjected to laboratory and analytical investigation. Nine W14 wide-flange columns were tested at different levels of axial force demand (35% to 75% of column yield strength) combined with lateral story drift demand of up to 10%. Since a specified loading sequence does not exist in building codes, one was developed based on the results of nonlinear earthquake time-history analysis of 3-story and 7-story buckling-restrained braced frame models. The first step in the loading sequence consisted of imposing simulated gravity load. Then in-phase, increasing amplitude cyclic axial load and story drift were applied. Experimental

results showed that flange local buckling was the dominant buckling mode. Specimens achieved interstory drift capacities of 0.07 rad. to 0.09 rad., in part, due to the delay in flange local buckling resulting from the stabilizing effect provided by the stocky column web of the W14 specimens. The finite element analysis program Abaqus was used to model the column specimens and to perform a parametric study investigating the effect of flange and web local buckling, lateral-torsional buckling, and axial load. Analysis and experimental results were observed to be well correlated. The behavior of deep columns (W18 and W24) with higher web slenderness than the tested W14 sections was also investigated. Models of deep column sections showed significant strength degradation due to the interaction of flange and web local buckling. Testing and finite element analysis indicated that the plastic rotation capacities currently predicted by Seismic Rehabilitation of Existing Buildings (ASCE 41) are very conservative for axial load ratios above 0.5. At axial load ratios below 0.5 the plastic rotation capacity of some finite element models was less than that predicted by ASCE 41. Using the database of finite element analysis results and regression analysis, nonlinear models were developed to more accurately predict rotation capacity of steel wide-flange columns. These models consider the interaction of flange and web local buckling, lateral-torsional buckling, and axial load.

**Dynamic Stability of Columns under Nonconservative Forces** Yoshihiko Sugiyama 2019-02-05 This book treats dynamic stability of structures under nonconservative forces. It is not a mathematics-based, but rather a dynamics-phenomena-oriented monograph, written with a full experimental background. Starting with fundamentals on stability of columns under nonconservative forces, it then deals with the divergence of Euler's column under a dead (conservative) loading from a view point of dynamic stability. Three experiments with cantilevered columns under a rocket-based follower force are described to present the verifiability of nonconservative problems of structural stability. Dynamic stability of columns under pulsating forces is discussed through analog experiments, and by analytical and experimental procedures together with related theories. Throughout the volume the authors retain a good balance between theory and experiments on dynamic stability of columns under nonconservative loading, offering a new window to dynamic stability of structures, promoting student- and scientist-friendly experiments.