

The Building Systems Integration Handbook The American Institute Of Architects

This book is about building evaluation in the broadest sense and it transcends the meaning and conventional boundaries of the evolving field of "post-occupancy evaluation" by focusing on evaluation throughout the building delivery process. This process is seen not just as being linear with a product in mind, i. e. , the completed and occupied building, but rather, it is seen as a cyclic evolution which has as its goal the continuous improvement of the quality of buildings. This goal can only be accomplished if evaluation occurs throughout the building delivery process, and if: 1. the evaluation that does occur is systematic and rigorous, 2. the data that is obtained can be fed into data bases and clearinghouses for use in future generations of buildings, and; 3. there is continuity in information flow. The idea for this book originated with a symposium that was part of a conference held at the Technical University in Delft, Netherlands, in July of 1988, i. e. , IAPS 10, the tenth biannual conference of the "International Association for the Study of People and their Physical Surroundings. " Authors presented papers based on their book chapters, and discussions ensued about the expanded boundaries of the field, about theoretical, methodological, and practical issues, as well as applications in building evaluation. Other relevant topics were identified and several additional authors were invited to participate in order to round out the contents of this book.

"There is today a pronounced and accelerated convergence in architecture. This convergence is occurring by does not thinkers; in practice not academia; in building design,

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fabrication, and construction. It is about solution-centric individuals engaged in real time problem solving, not in abstractions. The nature of this convergence, where things are converging and what that means for architecture, is the subject of this book." —from the Introduction Those working in architecture and engineering feel pressure to work faster, at lower cost, while maintaining a high level of innovation and quality. At the same time, emergent tools and processes make this possible. Convergence is about the firms, teams and people who thrive in this environment as a result of their ability to creatively combine and innovate. It seeks to answer several timely questions: What are the tools and work processes that are converging? How are individuals and organizations converging their tools and work processes? What challenges and benefits are they seeing? What is the ultimate endgame of this convergence? What skillsets and mindsets would someone need to develop to work effectively in this changing environment? What are the implications of convergence on the role of the designer, and on design? On how we design, build, fabricate, and construct? On how we work? The book explains how convergence relates to, but ultimately differs from integration, consolidation, multi-tasking, automation, and other forms of optimization. The practice-based research builds upon the author's research in BIM and in the collaborative leveraging of data in design and fabrication. As an investigation and meditation on the impact of technology on the education and making of design professionals Convergence explains what is happening in the world of design, and discusses the implications for the future of education, training and practice.

Integrating Building Performance with Design shows you the importance of designing for building performance early in your architectural design process. The book offers you simple tools and exercises, along with examples of built professional work

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and successful student projects illustrated by more than 100 full color images to help you with your work. Topics include site, solar orientation, thermal comfort, building enclosure, daylighting, passive heating and cooling, active heating and cooling, indoor air quality, stormwater, and rainwater harvesting.

Sustainable environmental control through building design Heating, Cooling, and Lighting is the industry standard text on environmental control systems with the emphasis on sustainable design. By detailing the many factors that contribute to the comfort in a building, this book helps architects minimize mechanical systems and energy usage over the life of the building by siting, building design, and landscaping to maximize natural heating, cooling, and lighting. This new fourth edition includes new information on integrated design strategies and designing for the Tropics. Resources include helpful case studies, checklists, diagrams, and a companion website featuring additional cases, an image bank, and instructor materials. Designing buildings that require less energy to heat, cool, and light means allowing the natural energy of the sun and wind to reduce the burden on the mechanical and electrical systems. Basic design decisions regarding size, orientation, and form have a great impact on the sustainability, cost, and comfort of a building. Heating, Cooling, and Lighting provides detailed guidance for each phase of a design project. Readers will: Understand the concept of sustainability as applied to energy sources Review the basic principles of thermal comfort, and the critical role of climate Learn the fundamentals of solar responsive design, including active and passive solar systems as well as photovoltaics Discover how siting, architectural design, and landscaping can reduce the requirements for mechanical and electrical systems In sustainable design, mechanical, and electrical systems should be used to only accomplish what

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the architect could not by the design of the building itself. With this in mind, designers require a comprehensive understanding of both the properties of energy and the human factors involved in thermal comfort. Heating, Cooling, and Lighting is the complete, industry-leading resource for designers interested in sustainable environmental control.

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.

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Systems Integration HandbookThe Building Systems Integration Handbook

The integration of photovoltaics (PV) into buildings goes beyond energy saving by providing a clean and elegant way of actually generating electricity. There are already numerous successful examples and rapid technological improvements promise expansion of PV's present niche market to that of a major energy provider of the 21st century. This handbook is the outcome of a five year programme which took place under the auspices of the International Energy Agency. Architects and solar experts from 13 countries addressed the wide range of engineering and architectural issues involved in the successful integration of PV into buildings. It demonstrates how to maximise the overall solar contribution to the building; integrate PV effectively with the building structure; clarify the relationship of PV with other elements of the building's energy system; optimise the system economics. It forms a thorough design guide that covers all aspects of the subject and will enable all building designers, engineers and property owners to make the integration of PV into buildings an architecturally appealing and energetically effective option.

An "anatomical" study of building systems integration with guidelines for practical applications Through a systems approach to buildings, *Integrated Buildings: The Systems Basis of Architecture* details the practice of integration to bridge the gap between the design intentions and technical demands of building projects. Analytic methods are introduced that illustrate the value, benefit, and application of systems integration, as well as guidelines for selecting technical systems in the conceptual, schematic, and design development stages of

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projects. Landmark structures such as Eero Saarinen's John Deere Headquarters, Renzo Piano's Kansai International Airport, Glenn Murcutt's Magney House, and Richard Rogers's Lloyd's of London headquarters are presented as part of an extensive collection of case studies organized into seven categories: Laboratories Offices Pavilions Green Architecture High Tech Architecture Airport Terminals Residential Architecture Advanced material is provided on methods of integration, including an overview of integration topics, the systems basis of architecture, and the integration potential of various building systems. An expanded case study of Ibsen Nelsen's design for the Pacific Museum of Flight is used to demonstrate case study methods for tracing integration through any work of architecture. Visually enhanced with more than 300 illustrations, diagrams, and photographs, *Integrated Buildings: The Systems Basis of Architecture* is a valuable reference guide for architecture and civil engineering students, as well as architects, engineers, and other professionals in the construction industry.

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. A new paradigm in facility management A unique, just-in-time resource from profession leader Eric

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Teicholz, Facility Design and Management Handbook empowers you to make your facility state of the art. Packed with tips from U.S. and international case studies from government, health care, retail, finance, manufacturing, and academia, this guide gives you access to the productivity tools, technologies, and stratagems that have revolutionized the field in the last five years, helping you to: Find the best, most cost-effective solutions for issues from “greenness” and sustainability to disaster recovery and technology integration Use new tools for space and asset allocation, project management, process coordination, and systems integration Improve accuracy in financial forecasting, budgeting, architectural and interior design planning, and market research Create cost-effective “smart” buildings with state-of-the art security, energy management, lighting strategies, and maintenance efficiency Discover innovative solutions for human resources needs Integrate the Internet into your management program Automate nearly all your tasks for major productivity gains Apply benchmarking standards and other measurements that demonstrate and assure facility management productivity Accompanying time-saving, efficiency-boosting CD-ROM is loaded with sample documents—from budgets, schedules, plans to cost-benefit analyses, checklists, forms and audits; standards for communications and database,

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integration, building and construction, CAD conventions; Web links and other resources.

"This book is a valuable addition to the reading list of executives, managers, and staff in business, government, and other sectors who seek to keep their enterprises agile and efficient as they manage change, implement new business processes and supporting technologies, and pursue important strategic goals"--Provided by publisher.

The Architectural Expression of Environmental Control Systems examines the way project teams can approach the design and expression of both active and passive environmental control systems in a more creative way. Using seminal case studies from around the world and interviews with the architects and environmental engineers involved, the book illustrates innovative responses to client, site and user requirements, focusing upon elegant design solutions to a perennial problem. This book will inspire architects, building scientists and building services engineers to take a more creative approach to the design and expression of environmental control systems - whether active or passive, whether they influence overall building form or design detail. Prepared & Sponsored by the American Institute of Architects, this practical new handbook contains approximately 450 pages of vital technical data, hundreds of illustrations, charts & tables & all the latest, proven technology, materials & design ideas.

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It serves as a text or reference for graduate or undergraduate courses in architecture, interior design, engineering & contracting.

The gold-standard design and documentation reference for students Architectural Graphic Standards, Student Edition condenses key information from the definitive industry reference to provide students with a powerful learning resource. Covering design and documentation for a variety of projects, this book offers extensive visuals backed by expert discussion to prepare students for work in a modern professional practice. This new 12th edition has been significantly updated to provide the latest information on important architectural developments and movements, with detailed coverage of sustainability, economy, technology, and more alongside current building standards and best practices. The companion website features sample curricula, student exercises, and classroom projects to aid the understanding of developing designers, and links to additional resources include professional associations, manufacturers' websites, and architectural articles to help students stay up-to-date as the field continues to evolve. Architectural Graphic Standards is the gold-standard reference for practicing architects, engineers, and builders; this Student Edition introduces key elements in a way that's relevant to the budding designer, along with ancillary materials that facilitate internalization. Delve

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into the design and documentation process for building materials and elements, as used in today's real-world practice Discover the latest advances in sustainability, digital fabrication, building information modeling, and more Learn the building standards and best practices for a wide variety of architectural details Examine thousands of illustrations, richly detailed graphics, PowerPoint slides, and links to additional resources Simply "knowing" graphic and documentation standards is not enough; future architects and engineers must develop an instinctual understanding and reflexive use of much of this material. Architectural Graphic Standards, Student Edition provides the depth and breadth of coverage they need, and the expert guidance that will help them succeed.

This book focuses on the implementation of Quality Function Deployment (QFD) in the construction industry as a tool to help building designers arrive at optimal decisions for external envelope systems with sustainable and buildable design goals. In particular, the book integrates special features into the conventional QFD tool to enhance its performance. These features include a fuzzy multi-criteria decision-making method, fuzzy consensus scheme, and Knowledge Management System (KMS). This integration results in a more robust decision support tool, known as the Knowledge-based Decision Support System QFD (KBDSS-QFD) tool. As an example, the KBDSS-QFD tool is used for the assessment of building envelope materials and designs

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for high-rise residential buildings in Singapore in the early design stage. The book provides the reader with a conceptual framework for understanding the development of the KBDSS-QFD tool. The framework is presented in a generalized form in order to benefit building professionals, decision makers, analysts, academics and researchers, who can use the findings as guiding principles to achieve optimal solutions and boost efficiency.

With the encroachment of the Internet into nearly all aspects of work and life, it seems as though information is everywhere. However, there is information and then there is correct, appropriate, and timely information. While we might love being able to turn to Wikipedia® for encyclopedia-like information or search Google® for the thousands of links on a topic, engineers need the best information, information that is evaluated, up-to-date, and complete. Accurate, vetted information is necessary when building new skyscrapers or developing new prosthetics for returning military veterans While the award-winning first edition of Using the Engineering Literature used a roadmap analogy, we now need a three-dimensional analysis reflecting the complex and dynamic nature of research in the information age. Using the Engineering Literature, Second Edition provides a guide to the wide range of resources available in all fields of engineering. This second edition has been thoroughly revised and features new sections on nanotechnology as well as green engineering. The information age has greatly impacted the way engineers find information. Engineers have an effect, directly and

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indirectly, on almost all aspects of our lives, and it is vital that they find the right information at the right time to create better products and processes. Comprehensive and up to date, with expert chapter authors, this book fills a gap in the literature, providing critical information in a user-friendly format.

Intelligent buildings provide stimulating environments for people to work and live in. This book brings together a body of the latest knowledge about design, management, technology and sustainability set against the background of developments in the cultural landscapes, which affect those living and working in buildings.

This book breaks new ground by creating a framework to understand clients' actions and needs. Most construction management books focus on improving the construction process; this one focuses on a better engagement with the client. It challenges conceptions of both the construction industry and clients' businesses so that a more effective process and greater client satisfaction can be achieved. The book suggests that 'buildings are not about building but about changing and developing the client'. The technical, organisational and psychological aspects of this are described and analysed in detail so that current experience can be explained and better practice determined. The book offers well-researched information about clients in a number of sectors - developers, supermarkets, NHS, government, airports and housing associations - which will help you understand what these client's business or service needs are and how construction fits into this. It

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demonstrates how to develop an appreciation of the client's perspective with a toolkit for ensuring successful client engagement. This makes Understanding the Construction Client a user-friendly and practical guide, as well as significant text for academia.

The main aim of this book is to present an intriguing retrospective of Building Performance Evaluation (BPE) as it evolved from Post-Occupancy Evaluation (POE) over the past 25 years. On one hand, this is done by updating original authors' chapter content of Building Evaluation, the first edition published in 1989. That, in turn, is augmented by an orientation toward current and future practice on the other, including new authors who are engaged in ongoing, cutting edge projects.

Therefore, individual, methodology oriented chapters covering the fundamental principles of POE and BPE go along with major thematic chapters, topics of which like sustainability or integration of new technologies are addressed in a diversity of case studies from around the globe. Research, methodologies, and framework of POEs continue to evolve. POEs are one step, on the larger scale of BPE, in understanding how buildings function after they are occupied. This resource helps architects, building owners, and facility managers understand the implications and reactions to the facilities that they designed, built and/or commissioned. By considering the whole process from conception to future uses of the building, there can be a more holistic approach to the planning, programming, design, construction, occupancy, and future adaptability of the structure. This book is dedicated to first editor Wolfgang

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F. E. Preiser who passed away during the process of editing and reviewing chapters of this volume.

The task of structuring information on built environment has presented challenges to the research community, software developers and the industry for the last 20 years. Recent work has taken advantage of Web and industry standards such as XML, OWL, IFC and STEP. Another important technology for the fragmented AEC industry is digital communication. Wired or wireless, it brings together architects, engineers and construction site workers, enabling them to exchange information, communicate and work together. Virtual enterprise organization structures, involving mobile teams over distance, are highly compatible with the needs of the construction industry.

Explore the most up-to-date green and sustainable methods for residential and commercial building construction as well as the latest materials, standards, and practices with CONSTRUCTION MATERIALS, METHODS AND TECHNIQUES: BUILDING FOR A SUSTAINABLE FUTURE, 4E. This comprehensive book's logical, well-structured format follows the natural sequence of a construction project. The book is the only one with an organization based on the Construction Specifications Institute (CSI) Masterformat standards. Readers will find the most current industry developments and standards as well as latest relevant building codes within a dynamic new design. This edition emphasizes coverage of today's construction materials, methods and techniques that is critical to success in the industry. Important Notice: Media content referenced within the

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Provides a bibliography of more than three thousand handbooks in various aspects of science and technology, from abrasives and band structures to yield strength and zero defects

Revised and significantly expanded, the fifth edition of this classic work offers both new and substantially updated information. As the definitive reference on fire protection engineering, this book provides thorough treatment of the current best practices in fire protection engineering and performance-based fire safety. Over 130 eminent fire engineers and researchers contributed chapters to the book, representing universities and professional organizations around the world. It remains the indispensable source for reliable coverage of fire safety engineering fundamentals, fire dynamics, hazard calculations, fire risk analysis, modeling and more. With seventeen new chapters and over 1,800 figures, the this new edition contains: Step-by-step equations that explain engineering calculations Comprehensive revision of the coverage of human behavior in fire, including several new chapters on egress system design, occupant evacuation scenarios, combustion toxicity and data for human behavior analysis Revised fundamental chapters for a stronger sense of context Added chapters on fire protection system selection and design, including

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selection of fire safety systems, system activation and controls and CO₂ extinguishing systems Recent advances in fire resistance design Addition of new chapters on industrial fire protection, including vapor clouds, effects of thermal radiation on people, BLEVEs, dust explosions and gas and vapor explosions New chapters on fire load density, curtain walls, wildland fires and vehicle tunnels Essential reference appendices on conversion factors, thermophysical property data, fuel properties and combustion data, configuration factors and piping properties “Three-volume set; not available separately”

Modern buildings are both wasteful machines that can be made more efficient and instruments of the massive, metropolitan system engendered by the power of high-quality fuels. A comprehensive method of environmental design must reconcile the techniques of efficient building design with the radical urban and economic reorganization that we face. Over the coming century, we will be challenged to return to the renewable resource base of the eighteenth-century city with the knowledge, technologies, and expectations of the twenty-first-century metropolis. This book explores the architectural implications of systems ecology, which extends the principles of thermodynamics from the nineteenth-century focus on more efficient machinery to the contemporary concern with the

resilient self-organization of ecosystems. Written with enough technical material to explain the methods, it does not include in-text equations or calculations, relying instead on the energy system diagrams to convey the argument. Architecture and Systems Ecology has minimal technical jargon and an emphasis on intelligible design conclusions, making it suitable for architecture students and professionals who are engaged with the fundamental issues faced by sustainable design. The energy systems language provides a holistic context for the many kinds of performance already evaluated in architecture—from energy use to material selection and even the choice of building style. It establishes the foundation for environmental principles of design that embrace the full complexity of our current situation. Architecture succeeds best when it helps shape, accommodate, and represent new ways of living together.

This thesis primarily deals with the adaptation of a theory from one context and its application in another context. In this case the "building systems integration theory" which has been introduced in the context of buildings, in the book Building Systems Integration Handbook (Rush, 1986), is adapted to the context of architectural organizations. The hypothesis of this research is that "building system integration principles can be applied to architectural business organizations." Building system integration

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theory defines four fundamental systems within buildings and five levels of integration ranging from unified to remote. It further defines an abstract two dimensional diagrammatic language that is referred to as a "ball diagram" for portraying the system integration within a building. Using the building system as an analogue to organizational structure, I have redefined the five levels of integration in the vocabulary of an organization and formulated seven systems in an organization on the basis of my literature review. I surveyed five prominent architectural firms in Texas (three Matrix organizations, and two Studio organizations) and discussed their project handling methods with their principals in charge, with the intention of investigating the degree of contact between personnel, their meeting patterns, and the reporting structure. This has helped me to identify the levels of integration between systems in each organization and eventually represent the working process of these firms using the diagrammatic language introduced in BSIH. The resulting diagrams, which primarily represent the production/ delivery segment of the organizations, reveal organizational structures during the project cycle as well as certain characteristics of a Matrix or Studio. Due to the limited scope of the survey done initially, some shortcomings were noticed in the diagramming method including the absence of any representation

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of the client and the user in the diagrams. Despite certain shortcomings owing to the scale of the investigation, it is felt that the diagramming method portrayed here is a novel yet effective idea to represent organizations and the levels of integration between systems in an organization that contributes to the production of a cohesive organizational design theory.

Covering both commercial and residential drawing, this text presents a detailed study of typical construction methods and the preparation of architectural working drawings. It includes chapters on technical vocabulary, study questions, problems and an appen

Explores and brings together the existent body of knowledge on building performance analysis

Building performance is an important yet surprisingly complex concept. This book presents a

comprehensive and systematic overview of the

subject. It provides a working definition of building performance, and an in-depth discussion of the role

building performance plays throughout the building

life cycle. The book also explores the perspectives of various stakeholders, the functions of buildings,

performance requirements, performance

quantification (both predicted and measured), criteria

for success, and the challenges of using

performance analysis in practice. Building

Performance Analysis starts by introducing the

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subject of building performance: its key terms, definitions, history, and challenges. It then develops a theoretical foundation for the subject, explores the complexity of performance assessment, and the way that performance analysis impacts on actual buildings. In doing so, it attempts to answer the following questions: What is building performance? How can building performance be measured and analyzed? How does the analysis of building performance guide the improvement of buildings? And what can the building domain learn from the way performance is handled in other disciplines? Assembles the current body of knowledge on building performance analysis in one unique resource Offers deep insights into the complexity of using building performance analysis throughout the entire building life cycle, including design, operation and management Contributes an emergent theory of building performance and its analysis Building Performance Analysis will appeal to the building science community, both from industry and academia. It specifically targets advanced students in architectural engineering, building services design, building performance simulation and similar fields who hold an interest in ensuring that buildings meet the needs of their stakeholders. Fills a need for a selective bibliography focusing on library design that will not only house collections appropriately but also be comfortable for readers

and staff.

The field of engineering is becoming increasingly interdisciplinary, and there is an ever-growing need for engineers to investigate engineering and scientific resources outside their own area of expertise. However, studies have shown that quality information-finding skills often tend to be lacking in the engineering profession.

Using the Engineerin

Presents seven strategies for energy efficient architectural design in Hawaii -- orientation and building form, solar control, daylighting, natural ventilation, landscaping, building systems and material selection and equipment efficiency. Provides architects with practical design guidelines to serve as a basis for decision making during the conceptual and schematic stages of a project. Drawings, graphs and photos.

Churches and Chapels: A Design and Development Guide is a reference for structure approach to design, development, or alteration of a building. The book deals with designing or altering traditional Western congregational halls and places of worship through a harmonious rendering of religious worship and social action. Part I of the book focuses on background, presenting general ideas and influences that made today's churches. Questions such as adapt or replace and concerns about design are addressed. This part also examines the role of today's clients and the possible types of churches and chapels that will prove desirable and satisfactory. Part II discusses the design process covering the need for a feasibility study and agreed design development. The feasibility study addresses

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retention of parts of the structure, size of the structure, costs, and consideration of other building designs.

Design analysis involves evaluation of the architectural considerations that include Western congregational halls, design ideas, check-ups, and sketching. The details of the scheme design contain precise information that will serve as basis for the client to modify or accept and for the authorities to approve. Throughout this book, case studies that are relevant for each topic are also given.

This guide is useful for administration of local, parochial, and district congregations. This book can likewise be appreciated by architects and structural engineers.

This comprehensive text provides a thorough overview of sustainable methods for site, residential and commercial building construction, covering both traditional and contemporary materials, current industry standards and new and emerging technologies. Organized according to the Construction Specifications Institute (CSI)

MasterFormat standards, the text follows a logical structure that charts the sequence of construction step-by-step from project inception to completion. Readers will find ample, up-to-date information on the latest industry advances and best practices, as well as relevant building codes, all within a dynamic, reader-friendly new design. This proven text can help your students gain a clear understanding of today's construction materials, methods and techniques, providing a critical foundation for career success. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

For a number of years, modular construction – the use of

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prefabricated elements in architecture – has once again become a subject of lively discussion and debate. Long written off as monotonous, today's building components are actually highly differentiated and capable of supporting and enhancing the architect's creativity. Numerous structures work with prefabricated components; for single-family homes the figure is ninety-eight percent, and modular systems are available that meet high aesthetic standards. This book provides an overview of the various different systems and their possible uses, particularly in the areas of housing, office, and industrial buildings. It explains the processes and components of modular construction and the behavior of the various materials when this construction approach is used. The authors offer strategies for planning and designing with prefabricated systems so that the architect can use them productively. Numerous drawings explain the principles of modular construction, while built examples forge a link between those principles and the practical activity of building.

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