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## **KEY=INDUSTRIAL - CARDENAS HOUSTON**

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### **MANAGING THE POTENTIAL OF MODULARIZATION AND STANDARDIZATION OF MEP SYSTEMS IN BUILDINGS - GUIDELINES FOR IMPROVEMENT BASED ON LEAN PRINCIPLES**

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*KIT Scientific Publishing*

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## **CLAIMS, DISPUTES AND LITIGATION INVOLVING BIM**

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*Routledge* **Are you unsure about: the current US legal environment with respect to BIM and VDC? the evolving standards of care for design and construction professionals using BIM and VDC? what practical methods and techniques can be used for analyzing construction claims and disputes involving BIM technologies and VDC processes? Building Information Modeling (BIM) technologies and Virtual Design and Construction (VDC) processes are aggressively and fundamentally changing the design, construction and operation of buildings. Supporters of BIM have highlighted the potential these technologies have to reduce the need for claims, disputes and litigation, but evidence from several early sources shows they are not universally successful in this. This timely and unique book provides crucial new methods for analyzing construction disputes in this emerging AEC technological landscape. It explains how BIM & VDC has significantly altered the production and delivery of construction drawings, quantity surveys, and schedules, and how these changes might impact construction disputes. The findings and advice in this book are indispensable to any stakeholder in a construction project using BIM. It will help Contractors, Cost Managers, Architects, Building Designers, Quantity Surveyors, and Project Managers to navigate and understand their responsibilities and exposure to risk when working with this new technology.**

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## **BUILDING EDUCATION AND RESEARCH**

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*Routledge* **Building Education and Research** explores this new active area of research in a series of papers by internationally acclaimed experts, presented at the CIB W89 International Conference on Building Education and Research held in July 1998 (BEAR `98) in Brisbane, Australia. Sponsored in collaboration jointly by the Queensland University of Technology, the Conseil International du Batiment (CIB) and the Australian Institute of Building (AIB), the conference was organised around the theme `Building Research and Education Beyond 2000' and looks at the factors that are changing the requirements of building education and research: economic and technological concerns; environmental concerns; government policies; Industries' demands; re-evaluation of community expectations.

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## **BIM FOR DESIGN COORDINATION**

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### **A VIRTUAL DESIGN AND CONSTRUCTION GUIDE FOR DESIGNERS, GENERAL CONTRACTORS, AND MEP SUBCONTRACTORS**

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*John Wiley & Sons* **A tactical guide to successful Virtual Design and Construction project coordination, featuring case studies from leading VDC firms. Virtual Design Coordination (VDC) employs information-rich Building Information Modeling (BIM) to enable specialty designers and contractors to create a single, coordinated set of designs that can prevent cost overruns, avoid schedule delays, and identify issues in the field. Although BIM-based design coordination is widely used in the commercial construction industry, there remains a need for a standardized practice. BIM for Design Coordination formalizes industry best practices and provides structured guidelines to the process. Helping readers gain the benefits of BIM-based design coordination, this practical guide covers areas such as setting up a project for success, model quality impacts on design coordination, carrying out a successful VDC session, and more. Specific guidelines for various project stakeholders are laid out in detail, while real-world examples of project design coordination workflows and templates for BIM Project Execution Plans (PxPs) are provided throughout the text. Written by a leading expert and educator in the field, this book: Provides a formal set of BIM-based design coordination guidelines that emphasize construction-stage coordination Features real-life case studies that illustrate how leading firms approach design coordination Covers BIM-based design coordination in other industries, such as infrastructure and industrial sectors Presents guidelines for all project stakeholders, including subcontractors, architects, engineers, fabricators, and owners Includes chapters on teaching BIM-based design coordination and the future of the field** **BIM for Design Coordination: A Virtual Design and Construction Guide for Designers, General Contractors, and MEP Subcontractors** is a much-needed resource for general contractors and members of VDC teams, as

well as academics, students, and professionals new to BIM-based design coordination.

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## **RESEARCH COMPANION TO BUILDING INFORMATION MODELING**

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*Edward Elgar Publishing* Offering critical insights to the state-of-the-art in Building Information Modeling (BIM) research and development, this book outlines the prospects and challenges for the field in this era of digital revolution. Analysing the contributions of BIM across the construction industry, it provides a comprehensive survey of global BIM practices.

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## **DELIVERING VALUE WITH BIM**

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## **A WHOLE-OF-LIFE APPROACH**

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*Routledge* Building Information Modelling (BIM) is a global phenomenon which is gaining significant momentum across the world. Currently there is little information on how to realise and monitor benefits from implementing BIM across the life-cycle of a built environment asset. This book provides a practical and strategic framework to realise value from implementing BIM by adapting Benefit Realisation Management theory. It presents an approach for practitioners aiming to implement BIM across the life-cycle of built environment assets, including both buildings and infrastructure. Additionally, the book features: wide-ranging information about BIM, the challenges of monitoring progress towards benefit goals and the greater context of implementation; a set of dictionaries that illustrate: how benefits can be achieved, what the benefit flows are and the enabling tools and processes that contribute to achieving and maximising them; a suite of measures that can serve to monitor progress with examples of how they have been used to measure benefits from BIM; real-world examples from across the world and life-cycle phases that show how these benefits can be achieved; and information on international maturity and competency measures to complement the value realisation framework. Including a blend of academic and industry input, this book has been developed in close collaborative consultation with industry, government and international research organisations and could be used for industry courses on BIM benefits and implementation for asset management or by universities that teach BIM-related courses.

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## **CONTEMPORARY STRATEGIES AND APPROACHES IN 3-D INFORMATION MODELING**

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*IGI Global* It is generally accepted that building information modeling (BIM) related technologies offer considerable advantages to many participants in the construction sector. Currently, there exists a whole range of commercially available BIM software platforms that are specialized to suit the functional needs of their main users. Contemporary Strategies and Approaches in 3-D Information Modeling is a critical scholarly resource that

examines building information modeling and the integration of 3-D information in the urban built environments. Featuring coverage on a broad range of topics such as integrated project delivery, design collaboration, and 3-D model visualization, this book is geared towards engineers, architects, contractors, consultants, and facility managers seeking current research on methodologies, concepts, and instruments being used in the field of 3-D information modeling.

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## **INTEGRATING PROJECT DELIVERY**

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*John Wiley & Sons* A revolutionary, collaborative approach to design and construction project delivery Integrated Project Delivery is the first book-length discussion of IPD, the emergent project delivery method that draws on each stakeholder's unique knowledge to address problems before they occur. Written by authors with over a decade of research and practical experience, this book provides a primer on IPD for architects, designers, and students interested in this revolutionary approach to design and construction. With a focus on IPD in everyday operation, coverage includes a detailed explanation and analysis of IPD guidelines, and case studies that show how real companies are applying these guidelines on real-world projects. End-of-chapter questions help readers quickly review what they've learned, and the online forum allows them to share their insights and ideas with others who either have or are in the process of implementing IPD themselves. Integrated Project Delivery brings together the owners, architect, engineers, and contractors early in the development stage to ensure that problems are caught early, and to address them in a collaborative way. This book describes the parameters of this new, more efficient approach, with expert insight on real-world implementation. Compare traditional procurement with IPD Understand IPD guidelines, and how they're implemented Examine case studies that illustrate everyday applications Communicate with other IPD adherents in the online forum The IPD approach revolutionizes not only the workflow, but the relationships between the stakeholders - the atmosphere turns collaborative, and the team works together toward a shared goal instead of viewing one another as obstructions to progress. Integrated Project Delivery provides a deep exploration of this approach, with practical guidance and expert insight.

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## **COOPERATIVE DESIGN, VISUALIZATION, AND ENGINEERING**

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### **11TH INTERNATIONAL CONFERENCE, CDVE 2014, SEATTLE, WA, USA, SEPTEMBER 14-17, 2014. PROCEEDINGS**

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*Springer* This book constitutes the refereed proceedings of the 11th International Conference on Cooperative Design, Visualization, and Engineering, CDVE 2014, held in Seattle, WA, USA, in September 2014. The 33 full and 10 short papers presented were carefully reviewed and selected

from 78 submissions. The papers cover topics such as cloud technology; the use of cloud for manufacturing, re-source selection, service evaluation, and control; methods for processing and visualizing big data created by the social media, such as Twitter and Facebook; real-time data about human interaction; sentiment analysis; trend analysis; location-based crowdsourcing; effective teamwork; cooperative visualization.

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## **BIM HANDBOOK**

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### **A GUIDE TO BUILDING INFORMATION MODELING FOR OWNERS, DESIGNERS, ENGINEERS, CONTRACTORS, AND FACILITY MANAGERS**

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*John Wiley & Sons* **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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## **ORGANIZATION DESIGN**

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*Emerald Group Publishing* **Advances in Strategic Management** is dedicated to communicating innovative, new research that advances theory and practice in Strategic Management. This volume focuses on organization design and collaborative ways of working.

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## **MANAGING IT IN CONSTRUCTION/MANAGING CONSTRUCTION FOR TOMORROW**

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*CRC Press* **Managing IT in Construction/Managing Construction for Tomorrow** presents new developments in:- Managing IT strategies - Model based

management tools including building information modeling- Information and knowledge management- Communication and collaboration - Data acquisition and storage- Visualization and simulation- Architectural design and

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## **BUILDING INFORMATION MODELING FOR DUMMIES**

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*John Wiley & Sons* **Everything you need to make the most of building information modeling** If you're looking to get involved in the world of BIM, but don't quite know where to start, *Building Information Modeling For Dummies* is your one-stop guide to collaborative building using one coherent system of computer models rather than as separate sets of drawings. Inside, you'll find an easy-to-follow introduction to BIM and hands-on guidance for understanding drivers for change, the benefits of BIM, requirements you need to get started, and where BIM is headed. The future of BIM is bright—it provides the industry with an increased understanding of predictability, improved efficiency, integration and coordination, less waste, and better value and quality. Additionally, the use of BIM goes beyond the planning and design phase of the project, extending throughout the building life cycle and supporting processes, including cost management, construction management, project management, and facility operation. Now heavily adopted in the U.S., Hong Kong, India, Singapore, France, Canada, and countless other countries, BIM is set to become a mandatory practice in building work in the UK, and this friendly guide gives you everything you need to make sense of it—fast. Demonstrates how BIM saves time and waste on site Shows you how the information generated from BIM leads to fewer errors on site Explains how BIM is based on data sets that describe objects virtually, mimicking the way they'll be handled physically in the real world Helps you grasp how the integration of BIM allows every stage of the life cycle to work together without data or process conflict Written by a team of well-known experts, this friendly, hands-on guide gets you up and running with BIM fast.

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## **INTEGRATED DESIGN AND DELIVERY SOLUTIONS**

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*Routledge* **Integrated Design and Delivery Solutions (IDDS)** represent a significant new research trajectory in the integration of architecture and construction through the rapid adoption of new processes. This book examines the ways in which collaboration and new methods of contracting and procurement enhance skills and improve processes in terms of lean and sustainable construction. Based on high quality research and practice-based examples that provide key insights into IDDS and its future potential, this book surveys the technologies that are being employed to create more sustainable buildings with added value for clients, stakeholders and society as whole.

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## **CONCURRENT ENGINEERING IN CONSTRUCTION PROJECTS**

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*Routledge* **Concurrent Engineering (CE)** is a systematic approach to the integrated and concurrent design of products and related processes, including aspects as diverse as manufacture and support. It is only now being carefully applied to the construction sector and offers considerable potential for increasing efficiency and effectiveness. It enables developers to consider all elements of a building or structure's life cycle from the conception stage right through to disposal, and to include issues of quality, cost, schedule, and user requirements. Drawing together papers that reflect various research efforts on the implementation of CE in construction projects, **Concurrent Engineering in Construction** presents construction professionals and academics with the key issues and technologies important for CE's adoption, starting with fundamental concepts and then going on to the role of organisational enablers and advanced information and communication technologies, then providing conclusions and suggestions of future directions.

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## **BIM HANDBOOK**

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### **A GUIDE TO BUILDING INFORMATION MODELING FOR OWNERS, MANAGERS, DESIGNERS, ENGINEERS AND CONTRACTORS**

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*John Wiley & Sons* "The **BIM Handbook** is an extensively researched and meticulously written book, showing evidence of years of work rather than something that has been quickly put together in the course of a few months. It brings together most of the current information about BIM, its history, as well as its potential future in one convenient place, and can serve as a handy reference book on BIM for anyone who is involved in the design, construction, and operation of buildings and needs to know about the technologies that support it. The need for such a book is indisputable, and it is terrific that Chuck Eastman and his team were able to step up to the plate and make it happen. Thanks to their efforts, anyone in the AEC industry looking for a deeper understanding of BIM now knows exactly where to look for it." —AECbytes book review, August 28, 2008 ([www.aecbytes.com/review/2008/BIMHandbook.html](http://www.aecbytes.com/review/2008/BIMHandbook.html)) **DISCOVER BIM: A BETTER WAY TO BUILD BETTER BUILDINGS** Building Information Modeling (BIM) offers a novel approach to design, construction, and facility management in which a digital representation of the building process is used to facilitate the exchange and interoperability of information in digital format. BIM is beginning to change the way buildings look, the way they function, and the ways in which they are designed and built. The **BIM Handbook, Second Edition** provides an in-depth understanding of BIM technologies, the business and organizational issues associated with its implementation, and the profound advantages that effective use of BIM can provide to all members of a project team. Updates to this edition include: Completely updated material covering the current practice and technology

in this fast-moving field Expanded coverage of lean construction and its use of BIM, with special focus on Integrated Project Delivery throughout the book New insight on the ways BIM facilitates sustainable building New information on interoperability schemas and collaboration tools Six new case studies Painting a colorful and thorough picture of the state of the art in building information modeling, the BIM Handbook, Second Edition guides readers to successful implementations, helping them to avoid needless frustration and costs and take full advantage of this paradigm-shifting approach to construct better buildings that consume fewer materials and require less time, labor, and capital resources.

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## **TOTAL CONSTRUCTION MANAGEMENT**

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### **LEAN QUALITY IN CONSTRUCTION PROJECT DELIVERY**

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*Taylor & Francis* **A convergence of lean management and quality management thinking has taken place in organizations across many industries, including construction. Practices in procurement, design management and construction management are all evolving constantly and understanding these changes and how to react is essential to successful management. This book provides valuable insights for owners, designers and constructors in the construction sector. Starting by introducing the language of total quality, lean and operational excellence, this book takes the reader right up to the latest industry practice in this sector, and demonstrates the best way to manage change. Written by two of the world's leading experts, Total Construction Management: Lean quality in construction project delivery offers a clearly structured introduction to the most important management concepts and practices used in the global construction industry today. This authoritative book covers issues such as procurement, BIM, all forms of waste, construction safety, and design and construction management, all explained with international case studies. It is a perfect guide for managers in all parts of the industry, and ideal for those preparing to enter the industry.**

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## **NATIONAL GUIDELINES FOR DIGITAL MODELLING**

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### **CASE STUDIES**

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### **CONSTRUCTION MANAGEMENT OF HEALTHCARE PROJECTS**

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*McGraw Hill Professional* **A complete, practical guide to managing healthcare facility construction projects Filled with best practices and the latest industry trends, Construction Management of Healthcare Projects describes the unique construction requirements of hospitals, including building components, specialized functions, codes, and regulations. Detailed case studies offer invaluable insight into the real-world application of the concepts presented. This authoritative resource provides in-depth information on how to safely and successfully deliver high-quality**

healthcare construction projects on time and within budget. Coverage includes: Regulations and codes impacting hospitals Planning and predesign Project budgeting Business planning and pro formas Healthcare project financing Traditional delivery methods for healthcare projects Modern project delivery methods and alternate approaches The challenges of additions and renovations Mechanical and electrical systems in hospitals Medical technology and information systems Safety and infection control Commissioning of healthcare projects Occupying the project The future of healthcare construction

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## **BIM FOR FACILITY MANAGERS**

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*John Wiley & Sons* A practical look at extending the value of Building Information Modeling (BIM) into facility management—from the world's largest international association for professional facility managers Building owners and facility managers are discovering that Building Information Modeling (BIM) models of buildings are deep reservoirs of information that can provide valuable spatial and mechanical details on every aspect of a property. When used appropriately, this data can improve performance and save time, effort, and money in running and maintaining the building during its life cycle. It can also provide information for future modifications. For instance, a BIM could reveal everything from the manufacturer of a light fixture to its energy usage to maintenance instructions. *BIM for Facility Managers* explains how BIM can be linked to facility management (FM) systems to achieve very significant life-cycle advantages. It presents guidelines for using BIM in FM that have been developed by public and private owners such as the GSA. There is an extensive discussion of the legal and contractual issues involved in BIM/FM integration. It describes how COBie can be used to name, capture, and communicate FM-related data to downstream systems. There is also extensive discussion of commercial software tools that can be used to facilitate this integration. This book features six in-depth case studies that illustrate how BIM has been successfully integrated with facility management in real-life projects at: Texas A&M Health Science Center USC School of Cinematic Arts MathWork's new campus Xavier University State of Wisconsin Facilities University of Chicago Library renovation *BIM for Facility Managers* is an indispensable resource for facility managers, building owners, and developers alike.

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## **BUILDING INFORMATION MODELING**

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### **TECHNOLOGY FOUNDATIONS AND INDUSTRY PRACTICE**

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*Springer* Building Information Modeling (BIM) refers to the consistent and continuous use of digital information throughout the entire lifecycle of a built facility, including its design, construction and operation. In order to

exploit BIM methods to their full potential, a fundamental grasp of their key principles and applications is essential. Accordingly, this book combines discussions of theoretical foundations with reports from the industry on currently applied best practices. The book's content is divided into six parts: Part I discusses the technological basics of BIM and addresses computational methods for the geometric and semantic modeling of buildings, as well as methods for process modeling. Next, Part II covers the important aspect of the interoperability of BIM software products and describes in detail the standardized data format Industry Foundation Classes. It presents the different classification systems, discusses the data format CityGML for describing 3D city models and COBie for handing over data to clients, and also provides an overview of BIM programming tools and interfaces. Part III is dedicated to the philosophy, organization and technical implementation of BIM-based collaboration, and discusses the impact on legal issues including construction contracts. In turn, Part IV covers a wide range of BIM use cases in the different lifecycle phases of a built facility, including the use of BIM for design coordination, structural analysis, energy analysis, code compliance checking, quantity take-off, prefabrication, progress monitoring and operation. In Part V, a number of design and construction companies report on the current state of BIM adoption in connection with actual BIM projects, and discuss the approach pursued for the shift toward BIM, including the hurdles taken. Lastly, Part VI summarizes the book's content and provides an outlook on future developments. The book was written both for professionals using or programming such tools, and for students in Architecture and Construction Engineering programs.

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## **CLAIMS, DISPUTES AND LITIGATION INVOLVING BIM**

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*Routledge* **Are you unsure about: the current US legal environment with respect to BIM and VDC? the evolving standards of care for design and construction professionals using BIM and VDC? what practical methods and techniques can be used for analyzing construction claims and disputes involving BIM technologies and VDC processes? Building Information Modeling (BIM) technologies and Virtual Design and Construction (VDC) processes are aggressively and fundamentally changing the design, construction and operation of buildings. Supporters of BIM have highlighted the potential these technologies have to reduce the need for claims, disputes and litigation, but evidence from several early sources shows they are not universally successful in this. This timely and unique book provides crucial new methods for analyzing construction disputes in this emerging AEC technological landscape. It explains how BIM & VDC has significantly altered the production and delivery of construction drawings, quantity surveys, and schedules, and how these changes might impact construction disputes. The findings and advice in this book are indispensable to any stakeholder in a construction project using BIM. It will**

help Contractors, Cost Managers, Architects, Building Designers, Quantity Surveyors, and Project Managers to navigate and understand their responsibilities and exposure to risk when working with this new technology.

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## **BUILDING INFORMATION MODELLING (BIM) IN DESIGN, CONSTRUCTION AND OPERATIONS**

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*WIT Press* **Building Information Modelling (BIM) in Design, Construction, and Operations** contains the proceedings of the first in a planned series of conferences dealing with design coordination, construction, maintenance, operation and decommissioning. The book gives details of how BIM tools and techniques have fundamentally altered the manner in which modern construction teams operate, the processes through which designs are evolved, and the relationships between conceptual, detail, construction and life cycle stages. The papers contributed by experts from industry, practice and academia, debate key topics, develop innovative solutions, and predict future trends. The interdisciplinary nature of the contents and the collaborative practices discussed, so important within the built environment, will appeal to those engaged in design, surveying, visualisation, infrastructure, real estate, construction law, insurance, and facilities management. Topics covered include: BIM in design coordination; BIM in construction operations, BIM in building operation and maintenance; BIM and sustainability; BIM and collaborative working and practices; BIM health and safety and BIM-facilities management integration, among others.

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## **THE CSI PROJECT DELIVERY PRACTICE GUIDE**

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*John Wiley & Sons* **Get the must-have reference on standards and best practices for the delivery of a construction project. The CSI Practice Guides are a library of comprehensive references specifically and carefully designed for the construction professional. Each book examines important concepts and best practices integral to a particular aspect of the construction process. Laying the foundation for this series, The CSI Project Delivery Practice Guide provides fundamental knowledge for the documentation, administration, and successful delivery of construction projects. It also serves as the pivotal starting point for understanding CSI's core values, as well as a useful study aid for those wishing to obtain the Construction Documents Technologist certificate. This easy-to-follow guide: Is a great introduction to the construction process for the new practitioner. Functions as a ready reference for the experienced construction professional. Packaged with the book is an access code which allows access to a password-protected web site with bonus content, including a PDF of the printed book and samples of CSI format documents, such as UniFormat and SectionFormat/PageFormat. The CSI Project Delivery**

**Practice Guide offers general information all construction professionals need for understanding their roles in the delivery of a construction project. Key principles are presented and discussed in detail to allow the reader to take full advantage of material covered in depth by the more specialized CSI Practice Guides. If you can own only one Practice Guide, this is the one to get.**

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## **ADVANCES IN INFORMATICS AND COMPUTING IN CIVIL AND CONSTRUCTION ENGINEERING**

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### **PROCEEDINGS OF THE 35TH CIB W78 2018 CONFERENCE: IT IN DESIGN, CONSTRUCTION, AND MANAGEMENT**

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*Springer* **This proceedings volume chronicles the papers presented at the 35th CIB W78 2018 Conference: IT in Design, Construction, and Management, held in Chicago, IL, USA, in October 2018. The theme of the conference focused on fostering, encouraging, and promoting research and development in the application of integrated information technology (IT) throughout the life-cycle of the design, construction, and occupancy of buildings and related facilities. The CIB - International Council for Research and Innovation in Building Construction - was established in 1953 as an association whose objectives were to stimulate and facilitate international cooperation and information exchange between governmental research institutes in the building and construction sector, with an emphasis on those institutes engaged in technical fields of research. The conference brought together more than 200 scholars from 40 countries, who presented the innovative concepts and methods featured in this collection of papers.**

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### **BUILDING DESIGN MANAGEMENT**

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*Routledge* **A practical handbook on the management of building design, this guide explains the processes, roles and responsibilities of those involved in the design of the building, as well as ways to maximise efficiency. Well structured and easy to read, the book includes useful notes and checklists on, for example, how to select a design team and how to organise and plan the design process. The authors are recognised authorities in the field of project management, based at an internationally renowned department. Their book will prove invaluable to both students and practitioners in project management.**

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### **CONSTRUCTION 4.0**

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### **ADVANCED TECHNOLOGY, TOOLS AND MATERIALS FOR THE DIGITAL TRANSFORMATION OF THE CONSTRUCTION INDUSTRY**

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*Woodhead Publishing* **At the beginning of the Fourth Industrial Revolution, the advent of digitalization, innovative technologies and materials, and new construction techniques have begun transforming the way that**

infrastructure, real estate, and other built assets can be designed, constructed, and operated in order to create a more attractive, energy-efficient, comfortable, affordable, safe, and sustainable built environment. Developments in materials and cutting-edge technologies (such as artificial intelligence, robotics, nanotechnology, 3D printing, and biotechnology) have finally started to move the construction towards a new era. Massive changes are occurring as a result of the possibilities created by big data and the Internet of Things, along with the technological advances that are driving down the cost of sensors, data storage, and computer services. **Construction 4.0: Advanced Technology, Tools and Materials for the Digital Transformation of the Construction Industry** presents a thorough review of developments in materials, emerging trends, cutting-edge technologies, and strategies in the fields of smart building design, construction, and operation, providing the reader with a comprehensive guideline on how to exploit the new possibilities offered by the digital revolution. It will be an essential reference resource for academic researchers, material scientists, and civil engineers, undergraduate and graduate students, and other professionals working in the fields of smart eco-efficient construction and cutting-edge technologies applied to construction. Features discussions on how nanomaterials, bio-based materials, and recycled materials are applied in the construction of buildings Analyzes the lifecycle of materials, buildings and design and construction operations Covers new methodologies and construction processes Provides case studies on cutting-edge digital technology such as AI and machine learning Examines all aspects of sustainability, including end-of-life of buildings

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## **TRANSPORT INFRASTRUCTURE AND SYSTEMS**

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### **PROCEEDINGS OF THE AIIT INTERNATIONAL CONGRESS ON TRANSPORT INFRASTRUCTURE AND SYSTEMS (ROME, ITALY, 10-12 APRIL 2017)**

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*CRC Press* **Transport Infrastructure Asset management in transport infrastructure, financial viability of transport engineering projects/ Life cycle Cost Analysis, Life-Cycle Assessment and Sustainability Assessment of transport infrastructure/ Infrastructures financing and pricing with equity appraisal, operation optimization and energy management/ Low-Volume roads: planning, maintenance, operations, environmental and social issues/ Public-Private Partnership (PPP) experience in transport infrastructure in different countries and economic conditions/ Airport Pavement Management Systems, runway design and maintenance/ Port maintenance and development issues, technology relating to cargo handling, landside access, cruise operations/ Infrastructure Building Information Modelling (I-BIM) / Pavement design and innovative bituminous materials/ Recycling and re-use in road pavements, environmentally sustainable technologies/ Stone pavements, ancient roads and historic railways/ Cementitious stabilization of materials used in the rehabilitation**

of transportation infrastructure. Transport Systems Sustainable transport and the environment protection including green vehicles/ Urban transport, land use development, spatial and transport planning/ Bicycling, bike, bike-sharing systems, cycling mobility/ Human factor in transport systems/ Intelligent Mobility: emerging technologies to enable the smarter movement of people and goods/Airport landside: access roads, parking facilities, terminal facilities, aircraft apron and the adjacent taxiway/ Transportation policy, planning and design, modelling and decision making/ Transport economics, finance and pricing issues, optimization problems, equity appraisal/ Road safety impact assessments, road safety audits, the management of road network safety and safety inspections/ Tunnels and underground structures: preventing incidents-accidents mitigating their effects for both people and goods/ Traffic flow characteristics, traffic control devices, work zone traffic control, highway capacity and quality of service/ Track-vehicle interactions in railway systems, capacity analysis of railway networks/ Risk assessment and safety in air and railway transport, reliability aspects/ Maritime transport and inland waterways transport research/ Intermodal freight transport: terminals and logistics.

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## **ADOPTING BIM FOR FACILITIES MANAGEMENT**

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### **SOLUTIONS FOR MANAGING THE SYDNEY OPERA HOUSE**

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This industry report to be developed from the Sydney Opera House FM Exemplar project series, provides a comprehensive overview of the digital modelling research stream of the project led by John Mitchell, principal of the consulting company CQR Pty Ltd and consultant to Construction Innovation's research partner CSIRO, which focuses on the application of Construction ICT, specialising in BIM and open standard model sharing such as IFC.

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## **KNOWLEDGE MANAGEMENT IN CONSTRUCTION**

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*John Wiley & Sons* A key problem facing the construction industry is that all work is done by transient project teams, and in the past there has been no structured approach to learning from projects once they are completed. Now, though, the industry is adapting concepts of knowledge management to improve the situation. This book brings together 13 contributors from research and industry to show how managing construction knowledge can bring real benefits to organisations and projects. It covers a wide range of issues, from basic definitions and fundamental concepts, to the role of information technology, and engendering a knowledge sharing culture. Practical examples from construction and other industry sectors are used throughout to illustrate the various dimensions of knowledge management. The challenges of implementing knowledge management are outlined and the ensuing benefits highlighted.

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## **BUILDING PRODUCT MODELS**

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### **COMPUTER ENVIRONMENTS, SUPPORTING DESIGN AND CONSTRUCTION**

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*CRC Press* **Building Product Models** thoroughly presents the concepts, technology, and methods now used to work out what will become the building product model - a new, digital representation for architecture, civil engineering, and building construction. Organized into three sections (history, current tools and concepts, and existing efforts and research issues), this resource provides the field of building product modeling with a standard reference as well as a single, comprehensive text for university courses. Until now, all the efforts in building modeling have been reported in research journals and conference proceedings or been made available as draft standards on the Internet. **Building Product Models** is the only book available on this vital field, bringing together essential aspects of major efforts from the early 1970s to the present.

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## **LEAN CONSTRUCTION**

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### **CORE CONCEPTS AND NEW FRONTIERS**

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*Routledge* This book collates the main research developments around Lean Construction over the past 25 years with contributions from many seminal authors in the field. It takes stock of developments since the publication of Koskela's (1992) *Application of the New Production Philosophy to Construction* and, in doing so, challenges current thinking and progress. It also crystallises theoretical conceptualisations and practically situated learning whilst identifying future research challenges, agendas and opportunities for global collaborative actions. The contributors present the development of Lean Construction as a fundamental part of improving construction productivity, quality and delivery of value to clients and users of built infrastructure. In doing so, the book introduces the reader to the foundational principles and theories that have influenced the way we now understand Lean Construction and has provided very useful insights to students, practitioners and researchers on key junctures over the last 25 years. Highlighting the key contemporary developments and using global case study material the chapters demonstrate good practice but also help introduce new thinking to both lay readers and experienced practitioners alike. This book is essential reading for undergraduate and postgraduate students, researchers and practitioners with an interest in Lean Construction and construction management, providing a general understanding of the area, current state of the art knowledge as well as providing an insight into areas for future research.

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## **BUILDING LEAN, BUILDING BIM**

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## **IMPROVING CONSTRUCTION THE TIDHAR WAY**

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*Routledge* **Building Lean, Building BIM** is the essential guide for any construction company that wants to implement Lean Construction and Building Information Modelling (BIM) to gain a strategic edge over their competition. The first of its kind, the book outlines the principles of Lean, the functionality of BIM, and the interactions between the two, illustrating them through the story of how Tidhar Construction has implemented Lean Construction and BIM in a concerted effort over four years. Tidhar is a small-to-medium-sized construction company that pioneered a way of working that gave it a profit margin unheard of in its market. The company's story serves as a case study for explanation of the various facets of Lean Construction and BIM. Each chapter defines a principle of Lean and/or BIM, describes the achievements and failures in Tidhar's implementation based on the experiences of the key people involved, and reviews the relevant background and theory. The implementation at Tidhar has not been a pure success, but by examining their motives alongside their achievements and failures, readers will learn about what pitfalls and pinnacles to expect. A number of chapters also compare the experience of Tidhar with those of other companies who are leaders in their fields, such as Skanska and DPR. This book is highly relevant and useful to a wide range of readers from the construction industry, especially those who are frustrated with the inefficiencies in their companies and construction projects. It is also essential reading for Lean and BIM enthusiasts, researchers and students from a variety of industries and backgrounds.

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## **PREFAB ARCHITECTURE**

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### **A GUIDE TO MODULAR DESIGN AND CONSTRUCTION**

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*John Wiley & Sons* "**Prefab Architecture . . . is beyond theory, and beyond most of what we think we know about pods, containers, mods, and joints. This book is more than 'Prefabrication 101.'** It is the Joy of Cooking writ large for the architecture and construction industries." —From the Foreword by James Timberlake, FAIA **THE DEFINITIVE REFERENCE ON PREFAB ARCHITECTURE FOR ARCHITECTS AND CONSTRUCTION PROFESSIONALS** Written for architects and related design and construction professionals, **Prefab Architecture** is a guide to off-site construction, presenting the opportunities and challenges associated with designing and building with components, panels, and modules. It presents the drawbacks of building in situ (on-site) and demonstrates why prefabrication is the smarter choice for better integration of products and processes, more efficient delivery, and realizing more value in project life cycles. In addition, **Prefab Architecture** provides: A selected history of prefabrication from the Industrial Revolution to current computer numerical control, and a theory of production from integrated processes to lean manufacturing Coverage on the tradeoffs of off-site fabrication including scope, schedule,

and cost with the associated principles of labor, risk, and quality Up-to-date products featuring examples of prefabricated structure, enclosure, service, and interior building systems Documentation on the constraints and execution of manufacturing, factory production, transportation, and assembly Dozens of recent examples of prefab projects by contemporary architects and fabricators including KieranTimberlake, SHoP Architects, Office dA, Michelle Kaufmann, and many others In Prefab Architecture, the fresh approaches toward creating buildings that accurately convey ature and expanded green building methodologies make this book an important voice for adopting change in a construction industry entrenched in traditions of the past.

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## **BIM AND INTEGRATED DESIGN**

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### **STRATEGIES FOR ARCHITECTURAL PRACTICE**

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*John Wiley & Sons* "Ready or not, it's high time to make BIM a part of your practice, or at least your vocabulary, and this book has as much to offer beginners as it does seasoned users of building information modeling software." —Chicago Architect The first book devoted to the subject of how BIM affects individuals and organizations working within the ever-changing construction industry, **BIM and Integrated Design** discusses the implementation of building information modeling software as a cultural process with a focus on the technology's impact and transformative effect—both potentially disruptive and liberating—on the social, psychological, and practical aspects of the workplace. **BIM and Integrated Design** answers the questions that BIM poses to the firm that adopts it. Through thorough research and a series of case study interviews with industry leaders—and leaders in the making out from behind the monitor—**BIM and Integrated Design** helps you learn: Effective learning strategies for fully understanding BIM software and its use Key points about integrated design to help you promote the process to owners and your team How BIM changes not only the technology, process, and delivery but also the leadership playing field How to become a more effective leader no matter where you find yourself in the organization or on the project team How the introduction of BIM into the workforce has significant education, recruitment, and training implications Covering all of the human issues brought about or exacerbated by the advent of BIM into the architecture workplace, profession, and industry, **BIM and Integrated Design** shows how to overcome real and perceived barriers to its use.

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## **THE IMPACT OF BUILDING INFORMATION MODELLING**

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### **TRANSFORMING CONSTRUCTION**

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*Routledge* Construction projects involve a complex set of relationships, between parties with different professional backgrounds trying to achieve a very complex goal. Under these difficult circumstances, the quality of

information on which projects are based should be of the highest possible standard. The line-based, two dimensional drawings on which conventional construction is based render this all but impossible. This is the source of some major shortcomings in the construction industry, and this book focuses on the two most fundamental of these: the failure to deliver projects predictably: to the required quality, on time and within budget; and the failure of most firms in the industry to make a survivable level of profit. By transforming the quality of information used in building, BIM aims to transform construction completely. After describing and explaining these problems, the way in which BIM promises to provide solutions is examined in detail. A discussion of the theory and practice of BIM is also provided, followed by a review of various recent surveys of BIM usage in the US, UK and selected European economies. The way in which other industries, including retail and manufacturing, have been transformed by information are explored and compared with current developments in the deployment of BIM in construction. Five case studies from the UK show how BIM is being implemented, and the effects it is having on architects and contractors. This book is perfect for any construction professional interested in improving the efficiency of their business, as well as undergraduate and postgraduate students wishing to understand the importance of BIM.

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## **BUILDING INFORMATION MODELING**

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### **A STRATEGIC IMPLEMENTATION GUIDE FOR ARCHITECTS, ENGINEERS, CONSTRUCTORS, AND REAL ESTATE ASSET MANAGERS**

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*John Wiley & Sons* The optimal approach to design, build, operate, and maintain buildings With this strategic guide to building information modeling (BIM), you'll learn how to implement this new technology as part of a comprehensive systems approach to the design, construction, management, operation, maintenance, and use of buildings. The authors, among the leading experts and pioneers in BIM, show you how BIM supports more streamlined, integrated, and efficient business processes throughout the lifecycle of buildings, from their initial conception through their eventual retirement or reuse. The result is better quality buildings, lower construction and operating costs, shorter project turnaround times, and a higher quality of building information to support better business decisions. Moreover, they set forth a plan for incorporating BIM into every organization's existing workflows, enabling you to take full advantage of all the benefits that BIM offers. Everything you need to implement a BIM approach is set forth in detail, including: The business case for BIM, demonstrating how it can improve collaboration, facilitate better design and construction, optimize workflow, and help reduce risk Guidance for meeting the challenges of BIM such as an entrenched business culture, the proliferation of BIM tools, and the uneven rates of BIM adoption The "big picture" view showing how your organization can work with business

partners and fit into the building life cycle in a BIM-enabled industry. Throughout the book, sample documents and figures help you better understand the principles of BIM and how it works in practice. In addition, first-hand accounts show you exactly how adopters of BIM have gained a competitive edge. Architects, engineers, constructors, building owners, and facility managers can turn to this book to realize the full potential of BIM and radically improve the way buildings are designed, built, operated, and maintained.

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## **WORK AND BUSINESS IN ARCHITECTURE, ENGINEERING AND CONSTRUCTION**

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### **ECPPM 2008**

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*CRC Press* Since 1994, the European Conference on Product and Process Modelling ([www.ecppm.org](http://www.ecppm.org)) has been providing a review of research, development and industrial implementation of product and process model technology in construction. The 7th European Conference on Product and Process Modelling (ECPPM 2008) provided a unique discussion platform for topics of

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## **LEAN PROJECT DELIVERY AND INTEGRATED PRACTICES IN MODERN CONSTRUCTION**

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*Routledge* **Lean Project Delivery and Integrated Practices in Modern Construction** is the new and enhanced edition of the pioneering book **Modern Construction** by Lincoln H. Forbes and Syed M. Ahmed. This book provides a multi-faceted approach for applying lean methodologies to improve design and construction processes. Recognizing the wide diversity in the landscape of projects, and encompassing private and public sector activity, buildings and infrastructure, the book expands upon the detailed coverage of integrated project delivery and new lean tools and techniques to include: Greater emphasis on the importance of creating a lean culture and the initiatives required to transform the industry; Expanded discussions of the foundational writings in lean construction theory; Exploration of the synergies between "lean" and "green" initiatives; Specific procedures for modifying planning and scheduling activities to improve the performance of the project team; Expanded sections on quality, and topics that have become a part of the lean lexicon, such as Choosing by Advantages, "line of balance"/location-based scheduling, virtual design teams, takt time planning and set-based design; Discussion questions for beginners and advanced lean practitioners; and Improved cross-referencing within the text to help the reader navigate the frameworks, techniques and tools to support the application of lean principles. The techniques described here enhance the use of resources, reducing waste, minimizing delays, increasing quality and reducing overall costs. They enable practitioners to improve the quality of the built

environment, secure higher levels of customer/owner satisfaction, and simultaneously improve their profitability. This book is essential reading for all those wanting to be at the forefront of construction management and lean thinking.

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**INDUSTRY 4.0 FOR THE BUILT ENVIRONMENT**

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**METHODOLOGIES, TECHNOLOGIES AND SKILLS**

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*Springer Nature*