

Enhanced Building Information Models Using Iot Services And Integration Patterns Springerbriefs In Computer Science

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.

This book investigates the latest modeling and control technologies in the context of air-conditioning systems. Firstly, it introduces the state-space method for developing dynamic models of all components in a central air-conditioning system. The models are primarily nonlinear and based on the fundamental principle of energy and mass conservation, and are transformed into state-space form through linearization. The book goes on to describe and discuss the state-space models with the help of graph theory and the structure-matrix theory. Subsequently, virtual sensor calibration and virtual sensing methods (which are very useful for real system control) are illustrated together with a case study. Model-based predictive control and state-space feedback control are applied to air-conditioning systems to yield better local control, while the air-side synergetic control scheme and a global optimization strategy based on the decomposition-coordination method are developed so as to achieve energy conservation in the central air-conditioning system. Lastly, control strategies for VAV systems including total air volume control and trim & response static pressure control are investigated in practice.

This book explains how to combine and exploit sensor networks and internet-of-things (IoT) technologies and Web-service design patterns to enrich and integrate Building Information Models (BIMs). It provides approaches and software architectures for facilitating the interaction with (and between) BIMs through Web services, and for enabling and facilitating the fusion of the information residing in such models or of information acquired from IoT technologies. The presented software architectures are presented in the form of design patterns.

The advent of connected, smart technologies for the built environment may promise a significant value that has to be reached to develop digital city models. At the international level, the role of digital twin is strictly related to massive amounts of data that need to be processed, which proposes several challenges in terms of digital technologies capability, computing, interoperability, simulation, calibration, and representation. In these terms, the development of 3D parametric models as digital twins to evaluate energy assessment of private and public buildings is considered one of the main challenges of the last years. The ability to gather, manage, and communicate contents related to energy saving in buildings for the development of smart cities must be considered a specificity in the age of connection to increase citizen awareness of these fields. The Handbook of Research on Developing Smart Cities Based on Digital Twins contains in-depth research focused on the description of methods, processes, and tools that can be adopted to achieve smart city goals. The book presents a valid medium for disseminating innovative data management methods related to smart city topics. While highlighting topics such as data visualization, a web-based ICT platform, and data-sharing methods, this book is ideally intended for researchers in the building industry, energy, and computer science fields; public administrators; building managers; and energy professionals along with practitioners, stakeholders, researchers, academicians, and students interested in the implementation of smart technologies for the built environment.

Planning and Managing Construction Projects with 4D CAD and Simulations

Natural Catastrophe Risk Management and Modelling

ECPPM 2021 - eWork and eBusiness in Architecture, Engineering and Construction

An Application of Phase Change Materials in Building Envelopes and Internal Structures

BIM and Construction Management

Building Information Modeling For Dummies

Biannually since 1994, the European Conference on Product and Process Modelling in the Building and Construction Industry has provided a review of research, given valuable future work outlooks, and provided a communication platform for future co-operative research and development at both European and global levels. This volume, of special interest to researchers, developers and end-users in product and process modelling and construction informatics, contains the proceedings of the 5th ECPPM conference, held in September 2004. It provides a comprehensive overview of European research, as well as an insight in US, Canadian and Australian research. It also highlights perspectives of ambient intelligence and recent industry developments, and in addition, presents the latest developments in e-work and e-business, virtual enterprising, and collaborative work, as well as related best-practice industry examples.

In today's digital, orsen, and consumer driven marketplace, it is critical to be knowledgeable about the latest approaches, tools and systems that can help you seamlessly and reliably conduct building performance verification assessments. This groundbreaking book provides you with a solid understanding of the underpinnings of embedded commissioning (ECx) as the overarching building evaluation approach. You find a review of significant and emerging approaches within ECx, including product models, process models, BIM (building information modeling), laser technology based modeling, mapping between process and product models, building codes, and data access and exchange standards. Moreover, this forward-looking resource provides you with details on the latest research findings in the areas of sensor networks, value based design, fields tools and AR/AV methods, just-in-time technologies, and wearable computers."

This book describes the latest methods and tools for the management of information within facility management services and explains how it is possible to collect, organize, and use information over the life cycle of a building in order to optimize the integration of these services and improve the efficiency of processes. The coverage includes presentation and analysis of basic concepts, procedures, and international standards in the development and management of real estate inventories, building registries, and information systems for facility management. Models of strategic management are discussed and the functions and roles of the strategic management center, explained. Detailed attention is also devoted to building information modeling (BIM) for facility management and potential interactions between information systems and BIM applications. Criteria for evaluating information system performance are identified, and guidelines of value in developing technical specifications for facility management services are proposed. The book will aid clients and facility managers in ensuring that information bases are effectively compiled and used in order to enhance building maintenance and facility management.

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.

eWork and eBusiness in Architecture, Engineering and Construction

Web Based Enterprise Energy and Building Automation Systems

Futuristic Research Trends and Applications of Internet of Things

Optimization, Control and Diagnosis

BIM and Urban Land Administration

Embedded Commissioning of Building Systems

Presenting an overview of the use of Phase Change Materials (PCMs) within buildings, this book discusses the performance of PCM-enhanced building envelopes. It reviews the most common PCMs suitable for building applications, and discusses PCM encapsulation and packaging methods. In addition to this, it examines a range of PCM-enhanced building products in the process of development as well as examples of whole-building-scale field demonstrations. Further chapters discuss experimental and theoretical analyses (including available software) to determine dynamic thermal and energy performance characteristics of building enclosure components containing PCMs, and present different laboratory and field testing methods. Finally, a wide range of PCM building products are presented which are commercially available worldwide. This book is intended for students and researchers of mechanical, architectural and civil engineering and postgraduate students of energy analysis, dynamic design of building structures, and dynamic testing procedures. It also provides a useful resource for professionals involved in architectural and mechanical-civil engineering design, thermal testing and PCM manufacturing.

The optimal approach to design, build, operate, and maintainbuildings With this strategic guide to building information modeling(BIM), you'll learn how to implement this new technology apart of a comprehensive systems approach to the design,construction, management, operation, maintenance, and use ofbuildings. The authors, among the leading experts andpioneers in BIM, show you how BIM supports more efficient and efficient business processes throughout the lifecycle of buildings, from their initial conception through their eventual retirement or reuse. The result is better qualitybuildings, lower construction and operating costs, shorter projectturnaround times, and a higher quality of building information tosupport better business decisions. Moreover, they set forth apln for incorporating BIM into every organization's existingworkflows, enabling you to take full advantage of all the benefitsat BIM offers. Everything you need to implement a BIM approach is setforth in detail, including: The business case for BIM, demonstrating how it can improvecollaboration, facilitate better design and construction, optimizeworkflow, and help reduce risk Guidance for meeting the challenges of BIM such as athenratched business culture, the proliferation of BIM tools, andthe uneven rates of BIM adoption The 'big picture' view showing how yourorganization can work with business partners and fit into thebuilding life cycle in a BIM-enabled industry Throughout the book, sample documents and figures help youbetter understand the principles of BIM and how it works inpractice. In addition, first-hand accounts show you exactlyhow adopters of BIM have gained a competitive edge. Architects, engineers, constructors, building owners, andfacility managers can turn to this book to realize the fullpotential of BIM and radically improve the way buildings aredesigned, built, operated, and maintained.

The capability and use of IT and web based energy information and control systems has expanded from single facilities to multiple facilities and organizations with buildings located throughout the world. This book answers the question of how to take the mass of available data and extract from it simple and useful information which can determine what actions to take to improve efficiency and productivity of commercial, institutional and industrial facilities. The book also provides insight into the areas of advanced applications for web based EIS and ECS systems, and the integration of IT/web based information and control systems with existing BAS systems.

This book presents a selection of papers from the 2017 World Conference on Information Systems and Technologies (WorldCIST'17), held between the 11st and 13th of April 2017 at Porto Santo Island, Madeira, Portugal. WorldCIST is a global forum for researchers and practitioners to present and discuss recent results and innovations, current trends, professional experiences and challenges involved in modern Information Systems and Technologies research, together with technological developments and applications. The main topics covered are: Information and Knowledge Management; Organizational Models and Information Systems; Software and Systems Modeling; Software Systems, Architectures, Applications and Tools; Multimedia Systems and Applications; Computer Networks, Mobility and Pervasive Systems; Intelligent and Decision Support Systems; Big Data Analytics and Applications; Human-Computer Interaction; Ethics, Computers & Security; Health Informatics; Information Technologies in Education; and Information Technologies in Radiocommunications.

Innovative Methods, User-Friendly Tools, Coding, and Design Approaches in People-Oriented Programming

Integrated Building Information Modelling

Knowledge Management and Information Tools for Building Maintenance and Facility Management

Building Information Modeling

PCM-Enhanced Building Components

This volume contains the papers presented at IALCCE2018, the Sixth International Symposium on Life-Cycle Civil Engineering (IALCCE2018), held in Ghent, Belgium, October 28-31, 2018. It consists of a book of extended abstracts and a USB device with full papers including the Fazlur R. Khan lecture, 8 keynote lectures, and 390 technical papers from all over the world. Contributions relate to design, inspection, assessment, maintenance or optimization in the framework of life-cycle analysis of civil engineering structures and infrastructure systems. Life-cycle aspects that are developed and discussed range from structural safety and durability to sustainability, serviceability, robustness and resilience. Applications relate to buildings, bridges and viaducts, highways and runways, tunnels and underground structures, off-shore and marine structures, dams and hydraulic structures, prefabricated design, infrastructure systems, etc. During the IALCCE2018 conference a particular focus is put on the cross-fertilization between different sub-areas of expertise and the development of an overall vision for life-cycle analysis in civil engineering. The aim of the editors is to provide a valuable source of cutting edge information for anyone interested in life-cycle analysis and assessment in civil engineering, including researchers, practising engineers, consultants, contractors, decision makers and representatives from local authorities.

eWork and eBusiness in Architecture, Engineering and Construction 2021 collects the papers presented at the 13th European Conference on Product and Process Modelling (ECPPM 2021, Moscow, 5-7 May 2021). The contributions cover a wide spectrum of thematic areas that hold great promise towards the advancement of research and technological development targeted at the digitalization of the AEC/FM (Architecture, Engineering, Construction and Facilities Management) domains. High quality contributions are devoted to critically important problems that arise, including: Information and Knowledge Management Semantic Web and Linked Data Communication and Collaboration Technologies Software Interoperability BIM Servers and Product Lifecycle Management Systems Digital Twins and Cyber-Physical Systems Sensors and Internet of Things Big Data Artificial and Augmented Intelligence in AEC Construction Management 5D/nD Modelling and Planning Building Performance Simulation Contract, Cost and Risk Management Safety and Quality Sustainable Buildings and Urban Environments Smart Buildings and Cities BIM Standardization, Implementation and Adoption Regulatory and Legal Aspects BIM Education and Training Industrialized Production, Smart Products and Services Over the past quarter century, the biennial ECPPM conference series, as the oldest BIM conference, has provided researchers and practitioners with a unique platform to present and discuss the latest developments regarding emerging BIM technologies and complementary issues for their adoption in the AEC/FM industry.

This book gathers the latest advances, innovations, and applications in the field of information technology in civil and building engineering, presented at the 18th International Conference on Computing in Civil and Building Engineering (ICCCBE), São Paulo, Brazil, August 18-20, 2020. It covers highly diverse topics such as BIM, construction information modeling, knowledge management, GIS, GPS, laser scanning, sensors, monitoring, VR/AR, computer-aided construction, product and process modeling, big data and IoT, cooperative design, mobile computing, simulation, structural health monitoring, computer-aided structural control and analysis, ICT in geotechnical engineering, computational mechanics, asset management, maintenance, urban planning, facility management, and smart cities. Written by leading researchers and engineers, and selected by means of a rigorous international peer-review process, the contributions highlight numerous exciting ideas that will spur novel research directions and foster multidisciplinary collaborations.

"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." —ACEBytes book review, August 28, 2008 (www.acebytes.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.

Modeling and Control in Air-conditioning Systems

Architecture in the Digital Age

Contemporary Strategies and Approaches in 3-D Information Modeling

Life Cycle Analysis and Assessment in Civil Engineering: Towards an Integrated Vision

A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors

Volume 3

The Internet of Things (IoT) is an interconnection of several devices, networks, technologies, and human resources to achieve a common goal. A variety of IoT-based applications are being used in different sectors and have succeeded in providing huge benefits to the users. As a revolution, IoT overtook the entire global landscape with its presence in almost every sector, including smart cities, smart grid, intelligent transportation, healthcare, education, and so on. This technological revolution also moved to the machines, converting them into intelligent computers that can make real-time decisions and communicate with each other, forming an Internet of Systems/Machines. The use of secure light-weight protocols will help us in developing environment-friendly and energy-efficient IoT systems. IoT is an emerging and recent area of research, adopted for many applications, and there is a need to investigate further challenges in all aspects of it. This book will provide information on fundamentals, architectures, communication protocols, use of AI, existing applications, and emerging research trends in IoT. It follows a theoretical approach to describe the fundamentals for beginners as well as a practical approach with the implementation of case studies for intermediate and advanced readers. The book will be beneficial for academicians, researchers, developers, and engineers who work in or are interested in fields related to IoT. This book serves as a reference for graduate and postgraduate courses in computer science, computer engineering, and information technology streams.

Medical and health activities can greatly benefit from the effective use of health informatics. By capturing, processing, and disseminating information to the correct systems and processes, decision-making can be more successful and quality care and patient safety would see significant improvements. The Handbook of Research on Patient Safety and Quality Care through Health Informatics highlights current research and trends from both professionals and researchers on health informatics as applied to the needs of patient safety and quality care. Bringing together theory and practical approaches for patient needs, this book is essential for educators and trainers at multiple experience levels in the fields of medicine and medical informatics.

This book presents research advances in automotive AC systems using an interdisciplinary approach combining both thermal science, and automotive engineering. It covers a variety of topics, such as: control strategies, optimization algorithms, and diagnosis schemes developed for when automotive air condition systems interact with powertrain dynamics. In contrast to the rapid advances in the fields of building HVAC and automotive separately, an interdisciplinary examination of both areas has long been neglected. The content presented in this book not only reveals opportunities when interaction between on-board HVAC and powertrain is considered, but also provides new findings to achieve performance improvement using model-based methodologies.

A sleeker, more comprehensive approach to construction projects BIM and Construction Management, Second Edition is a complete integration guide, featuring practical advice, project tested methods and workflows, and tutorials for implementing Building Information Modeling and technology in construction. Updated to align with the latest software editions from Autodesk, Trimble and Bentley, this book provides a common sense approach to leveraging BIM to provide significant value throughout a project's life cycle. This book outlines a results-focused approach which shows you how to incorporate BIM and other technologies into all phases of construction management, such as: Project planning: Set up the BIM project to succeed right from the start by using the right contracts, the right processes and the right technology Marketing: How to exceed customer expectations and market your brand of BIM to win. Pre-construction: Take a practical approach to engineer out risks in your project by using the model early to virtually build and analyze your project, prior to physical construction. Construction: Leverage the model throughout construction to build safer and with better quality. Field work: Learn how mobile technologies have disrupted the way we work in the field to optimize efficiencies and access information faster. Closeout: Deliver a better product to your customer that goes beyond the physical structure and better prepares them for future operations. Additionally, the book provides a look at technology trends in construction and a thoughtful perspective into potential use cases going forward. BIM and Construction Management, Second Edition builds on what has changed in the construction landscape and highlights a new way of delivering BIM-enabled projects. Aligning to industry trends such as Lean, integrated delivery methods, mobile platforms and cloud-based collaboration this book illustrates how using BIM and technology efficiently can create value.

A Guide to Building Information Modeling for Owners, Designers, Engineers, Contractors, and Facility Managers

Proven Tools, Methods, and Workflows

BIM Handbook

Using IoT Services and Integration Patterns

Building Information Modeling-enhanced Visualization Tool for Structural Health Monitoring

Enhanced Building Information Models

Real Estate and GIS focuses on the application of geographic information systems (GIS) and mapping technologies in the expanding property and real estate discipline. Whilst a thorough understanding of location is understood to be fundamental to the property discipline, real estate professionals and students have yet to harness the full potential of spatial analysis and mapping in their work. This book demonstrates the crucial role that technological advances can play in collecting, organising and analysing large volumes of real estate data in order to improve decision-making. International case studies, chapter summaries and discussion questions make this book the perfect textbook for property and applied GIS courses. Property and real estate professionals including surveyors, valuers, property developers, urban economists and financial analysts will also find this book an invaluable guide to the understanding and application of GIS technology within a real estate industry context.

Since 1994, the European Conferences of Product and Process Modelling (www.ecppm.org) have provided a review of research, development and industrial implementations of product and process model technology in the Architecture, Engineering, Construction and Facilities Management (AEC/FM) industry. Product/Building Information Modelling has matured sig- nificantly and the theoretical aspects of catastrophe risk assessment for insurance industry practitioners and public policy makers. Written by authors with both academic and industry experience, it also functions as an excellent graduate-level text and overview of the field. Ours is a time of unprecedented levels of risk from both natural and anthropogenic sources. Fortunately, it is also an era of relatively inexpensive technologies for use in assessing those risks. The demand from both commercial and public interests(including (re)insurers, NGOs, global disaster management agencies, and local authorities)for sophisticated catastrophe risk assessment tools has never been greater, and contemporary catastrophe modelling satisfies that demand. Combining the latest research with detailed coverage of state-of-the-art catastrophe modelling techniques and technologies, this book delivers the knowledge needed to use, interpret, and build catastrophe models, and provides greater insight into catastrophe modellings enormous potential and possible limitations. The first book containing the detailed, practical knowledge needed to support practitioners as effective catastrophe risk modellers and managers Includes hazard, vulnerability and financial material to provide the only independent, comprehensive overview of the subject, accessible to students and practitioners alike Demonstrates the relevance of catastrophe models within a practical, decision-making framework and illustrates their many applications Includes contributions from many of the top names in the field, globally, from industry, academia, and government Natural Catastrophe Risk Management and Modelling: A Practitioner's Guide is an important working resource for catastrophe modelling analysts and developers, actuaries, underwriters, and those working in compliance or regulatory functions related to catastrophe risk. It is also valuable for scientists and engineers seeking to gain greater insight into catastrophe risk management and its applications.

The automotive and aerospace industries have used information modeling techniques for years and now major construction companies are embracing BIM CD-ROM includes software evaluations, links, case studies, exercises, and more

The Practice of Enterprise Modeling

Advances in Informatics and Computing in Civil and Construction Engineering

Proceedings of the Sixth International Symposium on Life-Cycle Civil Engineering (IALCCE 2018), 28-31 October 2018, Ghent, Belgium

Applications in CAD, CAM and CAE Education

Building Information Modeling: Planning and Managing Construction Projects with 4D CAD and Simulations (McGraw-Hill Construction Series)

Proceedings of the 18th International Conference on Computing in Civil and Building Engineering

**When used appropriately, building performance simulation has the potential to reduce the environmental impact of the built environment, to improve indoor quality and productivity, as well as to facilitate future innovation and technological progress in construction. Since publication of the first edition of Building Performance Simulation for Design and Operation, the discussion has shifted from a focus on software features to a new agenda, which centres on the effectiveness of building performance simulation in building life cycle processes. This new edition provides a unique and comprehensive overview of building performance simulation for the complete building life cycle from conception to demolition, and from a single building to district level. It contains new chapters on building information modelling, occupant behaviour modelling, urban physics modelling, urban building energy modelling and renewable energy systems modelling. This new edition keeps the same chapter structure throughout including learning objectives, chapter summaries and assignments. Moreover, the book:
• Provides unique insights into the techniques of building performance modelling and simulation and their application to performance-based design and operation of buildings and the systems which service them.
• Provides readers with the essential concepts of computational support of performance-based design and operation.
• Provides examples of how to use building simulation techniques for practical design, management and operation, their limitations and future direction. It is primarily intended for building and systems designers and operators, and postgraduate architectural, environmental or mechanical engineering students.**

Enhanced Building Information ModelsUsing Iot Services and Integration PatternsSpringer
The latest technologies and even the ability of users to interface with new systems becomes a paramount concern. Research into new ways for humans to make use of advanced computers and other such technologies is necessary to fully realize the potential of twenty-first-century tools. Innovative Methods, User-Friendly Tools, Coding, and Design Approaches in People-Oriented Programming is a critical scholarly resource that examines development and customization user interfaces for advanced technologies and how these interfaces can facilitate new developments in various fields. Featuring coverage on a broad range of topics such as role-based modeling, end-user composition, and wearable computing, this book is a vital reference source for programmers, developers, students, and educators seeking current research on the enhancement of user-centric information system development.

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.

Recent Advances in Information Systems and Technologies

Automotive Air Conditioning

Handbook of Research on Developing Smart Cities Based on Digital Twins

A Practitioner's Guide

Design and Installation

Building Performance Simulation for Design and Operation

Building information modeling (BIM) is a set of interacting policies, processes and technologies that generates a methodology to manage the essential building design and project data in digital format throughout the building's life cycle. BIM, makes explicit, the interdependency that exists between structure, architectural layout and mechanical, electrical and hydraulic services by technologically coupling project organizations together. Integrated Building Information Modelling is a handbook on BIM courses, standards and methods used in different regions (Including UK, Africa and Australia). 13 chapters outline essential information about integrated BIM practices such as the BIM in site layout plan, BIM in construction project management, building life cycle assessment, quantity surveying and BIM in hazardous gas monitoring projects while also presenting information about useful BIM tool and case studies. The book is a useful handbook for engineering management professionals and trainees involved in BIM practice.

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.

This book gathers the proceedings of the EPPM 2019 conference, and highlights innovative work by researchers and practitioners active in various industries around the globe. Recent advances in science and technology have made it possible to seamlessly connect and integrate various elements of engineering systems, and opened the door for innovations that have transformed how we live and work. While these developments have yielded enhanced efficiency and numerous improvements in our current practices, the problems caused by the increased complexity of these integrated systems can be extremely difficult.

Accordingly, solving these problems involves applying cross-disciplinary expertise to address the heterogeneity of the various elements inherent in the system. These proceedings address four main themes: (I) Smart and Sustainable Construction, (II) Advances in Project Management Practices, (III) Toward Safety and Productivity Improvement, and (IV) Smart Manufacturing, Design, and Logistics. As such, they will be of interest to and valuable to researchers and practitioners in a range of industries seeking an update on the transitional fields of engineering, project, and production management.

BIM is an important technology and associated set of processes to produce, communicate, and analyze building models. BIM is a new concept within the construction industry. The objective of this thesis is to utilize BIM in pipeline construction projects as one of the pioneering steps to reduce rework and delays due to unforeseen conditions. This thesis presents evaluation and recommendations to help pipeline construction industry's transition from traditional two-dimensional drawings to a BIM management process aiding owners and contractors to develop and implement a basic form of BIM technique to manage their projects. This thesis uses two pipeline construction projects in the Cities of Dallas and Fort Worth, Texas, as case studies. These case studies are used to assess and evaluate the effects of applying a supplemental 4-D modeling techniques to enhance the pipeline project's coordination and productivity by minimizing rework and delays due to unforeseen conditions. Some companies may initially consider the costs associated with BIM software licensing and personnel training to be high. However, this thesis concludes that development of a supplemental four-dimensional model as simpler and more manageable alternatives in implementing a fully integrated BIM program is practical and cost effective.

Enhancing Productivity by Using Building Information Modeling Applications in Pipeline Construction Projects

Proceedings of the 35th CIB W78 2018 Conference: IT in Design, Construction, and Management

ECPPM 2012

Real Estate and GIS

LIDAR-photo Fusion Approach for Enhancing DEMs with Building Elevation Information

Handbook of Research on Patient Safety and Quality Care through Health Informatics

Rapid urbanization has created an unprecedented pressure on the use of land in cities around the world, resulting in physical and legal complexities. This book explains the theoretical basis and practicality of connecting urban land administration practices with the 3D digital data environment of Building Information Modelling (BIM). The main focus is to adopt a BIM-based paradigm for enhancing communication and management of complex ownership rights in multi-story buildings, which are prevalent in urban built environments. This book first elaborates on a range of data elements required for managing legal information in current land administration practices pertaining to subdivision of legal interests within multi-story building developments. It then explains how an open data model in the BIM domain – Industry Foundation Classes (IFC) – can be extended with legal data elements to lay the foundation for adopting BIM in urban land administration. The book also highlights benefits and barriers of implementing BIM-enabled urban land administration. Features Explains the theoretical basis and practicality of connecting urban land administration practices with the 3D digital data environment of BIM. Highlights the existing challenges associated with current practice of urban land administration for multi-story buildings. Introduces the potential of 3D digital environment of BIM for the purpose of mapping and registering legal interests. Describes how BIM-based data models can be extended for recording, managing, and representing legal ownership of properties over a building's lifecycle. Includes models of multi-story buildings as case studies to demonstrate the feasibility of extended BIM-based data models.

With growing number of modern complex infrastructure, robust and autonomous condition assessment of large-scale structures under operational loads and extreme climatic events has garnered significant attention. Data-driven structural health monitoring (SHM) techniques offer valuable information of existing health of the structures, maintain the safety and their uninterrupted use under varied operational conditions by undertaking risk and hazard mitigation promptly. However, just data-driven approaches are not enough to monitor a large amount of SHM data and conduct systematic decision making for future maintenance. Recently, Building Information Modeling (BIM) has become a valuable tool for design, production, construction, facility management and life-cycle analysis of buildings and bridges. Such a hybrid information modeling platform integrates the architectural, engineering and construction systems of a structure into one place allowing all users to incorporate various features effectively and accurately. In this thesis, a BIM-enabled system is utilized as a promising computing environment and integrated digital representation platform of SHM that can visualize a considerable amount of sensor data and subsequent structural health conditions over a prolonged period. In this research, three-dimensional Autodesk Revit® models of a large-span bridge and a pedestrian bridge in Thunder Bay, Ontario are developed to enable automated sensor data inventory into the BIM environment. Such automated tool facilitates achieving systematic maintenance and risk management, while avoiding manual errors resulting from visual inspections of the structures. The proposed integrated tool allows the practicing engineers in organizing, processing, and visualizing the sensor data from the monitoring system, updating relevant finite element (FE) models, and providing valuable feedback for structural retrofitting in a single platform. The data acquisition was performed on various seasons of the year to check the performance of the structure under various temperatures and traffic loading conditions. The results reveal that the proposed method can be considered as a user-friendly and economic framework for condition assessment of large-scale structures in ease.

The emergence and adoption of computational technologies has significantly changed design and design education beyond the replacement of drawing boards with computers or pens and paper with computer-aided design (CAD), computer-aided manufacturing (CAM), and computer-aided engineering (CAE) applications. Computational Design Methods and Technologies: Applications in CAD, CAM and CAE Education explores state-of-the-art developments in computational design methods and their impact on contemporary design education. Readers will find case studies, empirical research findings, pedagogical theories, and reflections. Researchers, educators, designers, and developers will better understand how applying pedagogical research and reflection has influenced and will continue to transform the field in the future.

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.

Building Information Modelling (BIM) in Design, Construction and Operations

ICCCBE 2020

Design and Manufacturing

Computational Design Methods and Technologies: Applications in CAD, CAM and CAE Education

Proceedings of the 5th European Conference on Product and Process Modelling in the Building and Construction Industry - ECPPM 2004, 8-10 September 2004, Istanbul, Turkey

The Application of Mapping Technologies

Architecture in the Digital Age addresses contemporary architectural practice in which digital technologies are radically changing how buildings are conceived, designed and produced. It discusses the digitally-driven changes, their origins, and their effects by grounding them in actual practices already taking place, while simultaneously speculating about their wider implications for the future. The book offers a diverse set of ideas as to what is relevant today and what will be relevant tomorrow for emerging architectural practices of the digital age.

This book explains how to combine and exploit sensor networks and internet-of-things (IoT) technologies and Web-service design patterns to enrich and integrate Building Information Models (BIMs). It provides approaches and software architectures for facilitating the interaction with (and between) BIMs through Web services, and for enabling and facilitating the fusion of the information residing in such models or of information acquired from IoT technologies. The proposed software architectures are presented in the form of design patterns. This information fusion will facilitate many novel application fields ranging from emergency response, to urban monitoring and surveillance, and to smart buildings. The book consists of 8 chapters. The first 2 chapters focus on the basics of BIMs, while chapter 3 presents fundamental service-oriented architecture patterns for complex information models. Subsequently, chapters 4 and 5 elaborate on the hardware and software side of IoT, with a special focus on their use for BIMs. Chapter 6 provides advanced SOA patterns for BIMs, while chapter 7 details patterns for IoT, and for BIM and IoT information fusion. Lastly, chapter 8 summarizes the work and provides an outlook on promising future developments. Overall, the book will be beneficial for researchers and developers in the fields of building information models, IoT applications, and systems integration.

Proceedings of the 13th European Conference on Product & Process Modelling (ECPPM 2021), 15-17 September 2021, Moscow, Russia

A Strategic Implementation Guide for Architects, Engineers, Constructors, and Real Estate Asset Managers

The 10th International Conference on Engineering, Project, and Production Management