ICCREM 2022

CARBON PEAK AND NEUTRALITY STRATEGIES OF THE CONSTRUCTION INDUSTRY

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON CONSTRUCTION AND REAL ESTATE MANAGEMENT 2022

December 17-18, 2022

SPONSORED BY

The Construction Industry High-Quality Development Institute of the China Construction Industry Association, PR China

Journal of Engineering Management, PR China

Buildings, Switzerland

The Construction Institute of the American Society of Civil Engineers

EDITORS
Yaowu Wang
Shaohua Lin
Geoffrey Q. P. Shen





Published by the American Society of Civil Engineers

Published by American Society of Civil Engineers 1801 Alexander Bell Drive Reston, Virginia, 20191-4382 www.asce.org/publications | ascelibrary.org

Any statements expressed in these materials are those of the individual authors and do not necessarily represent the views of ASCE, which takes no responsibility for any statement made herein. No reference made in this publication to any specific method, product, process, or service constitutes or implies an endorsement, recommendation, or warranty thereof by ASCE. The materials are for general information only and do not represent a standard of ASCE, nor are they intended as a reference in purchase specifications, contracts, regulations, statutes, or any other legal document. ASCE makes no representation or warranty of any kind, whether express or implied, concerning the accuracy, completeness, suitability, or utility of any information, apparatus, product, or process discussed in this publication, and assumes no liability therefor. The information contained in these materials should not be used without first securing competent advice with respect to its suitability for any general or specific application. Anyone utilizing such information assumes all liability arising from such use, including but not limited to infringement of any patent or patents.

ASCE and American Society of Civil Engineers—Registered in U.S. Patent and Trademark Office.

Photocopies and permissions. Permission to photocopy or reproduce material from ASCE publications can be requested by sending an e-mail to permissions@asce.org or by locating a title in ASCE's Civil Engineering Database (http://cedb.asce.org) or ASCE Library (http://ascelibrary.org) and using the "Permissions" link.

Errata: Errata, if any, can be found at https://doi.org/10.1061/9780784484562

Copyright © 2022 by the American Society of Civil Engineers. All Rights Reserved. ISBN 978-0-7844-8456-2 (PDF) Manufactured in the United States of America.

ICCREM 2022 iii

Preface

We would like to welcome you to the 2022 International Conference on Construction and Real Estate Management (ICCREM 2022), organized by Harbin Institute of Technology, Jiangxi Construction Engineering (Group) CO., LTD., the Hong Kong Polytechnic University, Tsinghua University, Umeå University, Beijing University of Civil Engineering and Architecture, Louisiana State University, University of Alberta, Guangzhou University, Marquette University, and Nottingham Trent University. The Conference is a continuation of the ICCREM series which have been held annually since 2003.

The theme for this conference is "Carbon Peak and Neutrality Strategies of the Construction Industry". It especially highlights carbon emissions and environmental impacts of construction industry. The conference proceedings include 95 peer-review papers covered fourteen important subjects. And all papers went through a two-step peer review process. The proceedings of the congress are divided into four parts:

- Low Carbon Construction and Building
- Innovative Technology and Intelligent Construction
- Real Estate and Urban Management
- Construction Enterprises and Project Management

On behalf of the Construction Institute, the American Society of Civil Engineers and the 2022 ICCREM Organizing Committee, we welcome you to participate in the conference and wish you leave with a wonderful experience and memory at ICCREM 2022.

Professor Yaowu Wang

Harbin Institute of Technology, P. R. China

Senior Engineer Shaohua Lin

Jiangxi Construction Engineering (Group) CO, LTD. P. R. China

ICCREM 2022 iv

Acknowledgments

Organized by

Harbin Institute of Technology, P.R. China

Jiangxi Construction Engineering (Group) CO., LTD., P.R. China

The Hong Kong Polytechnic University, P.R. China

Tsinghua University, P.R. China

Umeå University, Sweden

Beijing University of Civil Engineering and Architecture, P.R. China

Louisiana State University, USA

University of Alberta, Canada

Guangzhou University, P.R. China

Marquette University, USA

Nottingham Trent University, UK

Executive Editors

Jingbin Wang Yadi Zhang Xueling Lu

Qipeng Zhu Fuzhen He Jin Shen

Haitao Yu Guanghui Zhang Xuan Guo

Jinye Huang Ye Liu Siying Hu

Xumiao Zhang Yuxin Fan

Yidong Tang Yujuan Zhang

Conference website: http://www.iccrem.com/

Email: iccrem@vip.163.com

ICCREM 2022 v

Conference Committee

Committee Chairs

Prof. Yaowu Wang, Harbin Institute of Technology, P.R. China

Prof. Geoffrey Q.P. Shen, the Hong Kong Polytechnic University, P.R. China

Conference Executive Chair

Senior Engineer Shaohua Lin, Jiangxi Construction Engineering (Group) CO., LTD., P.R. China

Conference Co-Chairs

Prof. Yimin Zhu, Louisiana State University, USA

Prof. Mohamed Al-Hussein, University of Alberta, Canada

Chief Engineer Xingang Li, Jiangxi Construction Engineering (Group) CO., LTD., P.R. China

Prof. Xiaolong Xue, Guangzhou University, P.R. China

Prof. Chengshuang Sun, Beijing University of Civil Engineering and Architecture, P.R. China

Prof. Yong Bai, Marquette University, USA

Prof. Ming Sun, Nottingham Trent University, UK

Senior Fellow XiaodongLi, Tsinghua University, P.R. China

Prof. Weizhuo Lu, Umeå University, Sweden

Organizing Committee and Secretariat

General Secretariat

Asso. Prof. Qingpeng Man, Harbin Institute of Technology, P.R. China Senior Fellow Hongling Guo, Tsinghua University, P.R. China

Deputy General Secretariat

Dr. Kailun Feng, Harbin Institute of Technology, P.R. China

Dr. Tao Yu, Harbin Institute of Technology, P.R. China

Committee Members

Ms. Shuo Wang, Harbin Institute of Technology, P.R. China

Contents

Low Carbon Construction and Building

A Review of Low-Carbon and Energy-Saving Renovation of Existing Buildings1 Haitao Yu, Qingpeng Man, and Kailun Feng
Calculation and Forecasting of Carbon Emissions from the Construction
Industry in Hebei Province9
Chunjing Shang, Boxin Wei, Danna Jia, Xiaodong Li, and Yue Sun
Study on Green Building Development from a Spatial Perspective: A Systematic Review16
Hui Yan, Ziyan Fan, Lei Zhang, and Xiaochun Luo
Differential Improvement Path of Carbon Emissions Efficiency of China's Provincial Construction Industry: A Qualitative Comparative
Analysis Approach
Study on Carbon Reduction Capacity of Sponge City Facilities
A Study on the Influencing Factors for the Promotion of Passive Ultra Low Energy Buildings in China Based on DEMATEL-ISM Model47 Yuejun Liu and Long Wang
Research on Local Updating of Silted Building in Tujia Nationality under the Goal of "Carbon Emissions Peak and Carbon Neutralization"
Zehua Jiang and Lin Lin
An Empirical Study on Energy Saving and Emissions Reduction of Prefabricated Buildings Based on the Whole Life Cycle69 Yao Li and Jie Zhang
Preliminary Study of Source Reduction Technology for C&D Waste Special Planning in China Based on Double Carbon Target
China's Green Building Special Planning Framework Thinking and Strategic Suggestions in Circumstances of Low-Carbon Concept89 Yuefang Rong, Xiaokun Sun, Jian Song, and Yi Wang

Research Status of Bottom-Up Building Energy Consumption Modeling Board on Bibliometries	ΛΛ
Modeling Based on Bibliometrics	.UU
Analysis of Factors Affecting CO ₂ Emissions in Six Central Chinese Cities1 Zhiting Chen, Xiaokun Sun, Xinwanghao Xu, Peihao Wang, and Bin Lv	.10
Embodied Carbon Emissions of China's Building Sector: A Dynamic Perspective1	29
Chen Zhu, Xiaodong Li, and Zhihan Yang	
Research on the Sustainable Development of Real Estate Economy in China under the Dual Carbon Strategy1 Jin Li	.37
Evolutionary Game Model of Construction Enterprises and Construction Material Manufacturers in Construction and Demolition Waste Resource Utilization	45
Zhiguo Shao, Mengdi Li, Dehu Yu, Chuanfeng Han, and Lingpeng Meng	
Research on Carbon Emissions Measurement during Materialization Stage of Prefabricated Buildings: A Case Study of Urban Renewal Project in Guangzhou	56
Zhibiao Hao, Yousong Wang, Ziyan Fan, Hui Yan, and Tao Shen	.50
Research on the Financing Mode of Green Bond Supporting Green Building Development	.7 0
Xiaoyuan Wang and Hongxing Wen	
Quantitative Assessment of the Sulphoaluminate Cement Embodied Carbon Emissions	76
Chunjing Shang, Chenggen Wu, Liulei Lu, Kaiqing Yao, and Junfeng Wang	.,,
Research on Green Design of Exhibition Spaces in Campus Museums	.83
Carbon Emissions Assessment Study of Standard Ring Materialization Stage of Assembled Subway Stations	193
Research on Priority Analysis of Green Renovation Content in Old Residential Areas Based on Structural Equation Model	204

ICCREM 2022 viii

Research on the Design of University Informal Learning Space under the Concept of Sustainable Development	212
Junkai Wang and Ling Yu	
Research on the Implementation Paths of Green Construction under the "Double Carbon" Goal	220
Feiyan Zhao and Xiaotian Zhao	
Carbon Emissions of Operation Stage of Residential Buildings in Hot Summer and Warm Winter Zone in China	227
Lu Lin, Xiuqin Yin, Sijie Zhong, Ke Lin, Yaojie Huang, and Weimin Feng	
The Recycling of Construction and Demolition Waste from a Circular Economy Perspective	236
Zhenqiang Wu, Luqi Wang, Qizhi Ye, and Weimin Feng	
Optimization of Transportation Route of Construction Waste Using the Quota Based Carbon Emissions Management	244
Xiaojiao Chen, Yuan Fang, Xinyi Shi, and Zicheng Cai	
Green Facility Management: The Wuli-Shili-Renli Framework and System Dynamics Model Liang Liu and Haonan Jiang	252
Research on Dynamic Evaluation of Organizational Effectiveness for Construction Enterprises under "Carbon-Peak and Carbon-Neutralization" Strategies	258
Dan Li, Peining Yang, and Meiling Chen	
Innovative Technology and Intelligent Construction	
Automatic Cause Inference of Construction Accident Using Long Short-Term Memory Neural Networks	269
Hengqin Wu, Geoffrey Qiping Shen, Zhenzong Zhou, Wenpeng Li, and Xin Li	
Multi-Worker Tracking Algorithm Based on Combined Feature Clustering Ying Zhou, Xiao Lin, Zhubang Luo, and Hongling Guo	276
Integrating BIM and IoT for Digital Twin Platform in Building	294
Operation Management: Opportunities and Challenges	404
Explanatory Sequence Research on the Development and Innovation Path of Digital Construction Industry	293
Xianyu Tan, Xiaolong Xue, Qiongyu Huang, Hui Zhu, and Jianshuo Chen	·····

Planning Algorithm Based on BIM	205
Jiqiang Hu, Rongjiang Huang, Qiang Zeng, Shipeng Luo, and Xianhe Wang	
Study on Resilience Evaluation of Waterlogging in Deep Foundation	
Pit Projects Based on the Random Forest	315
Yufei Liu, Hongbing Li, and Junwu Wang	
Study on Multi-Level Safety Risk Assessment of Super 40 m Deep	
Foundation Pit Construction Adjacent to Subway	321
Sen Liang, Shilong Zhang, Wei Liao, Changyong Liu, Zhijie Tan, Yingzhou Luo, and Jiaojiao Ai	
A Complex Network Approach to Modeling the Causations of Major	
Construction Safety Accidents	332
A Review on Current Advances of Intelligent Construction Based on Bibliometric Analysis	340
Jingke Yan, Zhe Zheng, Yucheng Zhou, Jiarui Lin, and Yichuan Deng	
Research on Waterproof Performance of Composite Sealing Gasket for	
Assembly Joints of Prefabricated Subway Station	356
Jian Zhao, Shaojun Wang, and You Zhou	330
Obstacle Analysis in Standardization Promotion of Prefabricated	
Components Based on the DEMATEL-ISM Method	367
Yunfei Xia, Wei Chen, Kai Zhang, Yong Zhang, and Xianqing Chen	
z wanes z zam, y es esten, z zam z mang, z este z zamag, ante z zamag, ante z zamag	
Research on Improving the Integrity of Joints in Prefabricated Building	27.5
ComponentsDedong Kong, Guangjie Liu, and Xuelei Zhou	3/3
Research on Key Factors of Cost of Prefabricated Building EPC Project	
Based on SNA	382
Tiankang Deng, Xiangzhong Tang, Liying Wang, and Zhipeng Gao	
Measuring the Complexity of Mega Projects with Markov Chain-Entropy Model	301
Yuyang Liu, Jiale Wang, Qiushi Bo, and Lan Luo	······································
Next-Generation Infrastructure Design Method Based on Digital Twin	
Next-Generation Infrastructure Design Method Based on Digital Twin Technology for Automated Container Terminal	402
Yu Cao, Qingcheng Zeng, Hee Rui He, and Ang Yang	

Research on the Information Management of Shanghai Lilong Buildings410 Jue Lu, Shenglan Zheng, and Bo Zheng
Application Research on Life Cycle Safety Management of Construction Project Based on BIM-4D419
Haoliang Ye, Luqi Wang, Wenyi Cen, and Weimin Feng
Network Model Analysis of Quality Control Factors of Prefabricated Buildings Based on Complex Network Theory427 Shulan Yang, Zhiwei Hou, and Hongbo Chen
Research on Cost Influencing Factors and Control Measures of
Prefabricated Housing Based on Interpretation Structural Modeling437 Lu Lin, Xiuqin Yin, Yaojie Huang, Ke Lin, and Weimin Feng
Research on Incremental Cost Effectiveness of Prefabricated Housing from the Perspective of Reducing Loan Interest in the
Construction Stage445
Yang Jin, Xiuqin Yin, Lu Lin, Yaojie Huang, and Weimin Feng
An Input-Output Analysis of Chinese Cities in WEF Nexus Based on
Intensity and Quantity Index System453 Zihao Shen, Chengshuang Sun, Ying Li, and Ke Zhang
Research on Integrated Management of L Hotel Construction Project
Based on BIM5D461 Haize Pan, Yongwei Pan, and Chengjin Wu
Ecological and Economic Evaluation and Empirical Study on
Prefabricated Residence470 Lu He
Real Estate and Urban Management
An Investigation on the Spatial Coupling Relationship between Metro Station and Job: Housing Spatial Structure in Shenzhen479 Chunmei Chen and Yani Lai
Research on the Coupling and Coordination of Intensive Land Use and New Urbanization in Chengdu-Chongqing Urban Agglomeration488 Zhenhua Wu, Yingying Huang, and Yabei Wang
Land Reserve Potential Evaluation Based on GIS and Big Data Analysis: A Case Study of Nansha District, Guangzhou, China496
Hengzhi Song, Yuanyi Xie, Xinyue Gu, and Chengfang Wang

Different Investment Fields: A Comparison between Investment in	
Real Estate and Venture Capital	.509
An Empirical Study on Asset Structure and Enterprise Performance of Listed Real Estate Companies	.517
Migrant Workers in Cities into Target Implementation Schedule Impact on Housing Consumption Yu Zhang and Zhe Yang	.524
A Case Study on the Collaborative Governance Mechanism of Old Residential Area Renovation Project from the Perspective of "Structure-Process"	.536
Beibei Qin, Hong Fan, and Rui Ding	
The Extent of the Impact of Basic Education Resources on Housing Prices Based on the Case Study of Harbin	.543
Study on the Impact of Population Aging on Real Estate Market: Taking Liaoning Province as an Example	.554
Research on Performance Evaluation of Urban Rail Transit Based on DEA Fengping Xue	.563
Research on Real Estate New Media Marketing Strategy Based on Consumer Behavior Characteristics	.574
Spatial Correlation between Innovation Aggregation and Housing Prices Fan Dong and Lin Zhu	.581
Practical Exploration of Order Training for New Residence Digital Brokers Jie Zhang and Yao Li	.588
Identification and Evaluation of Urban Public Centers from Temporal and Spatial Perspectives: A Case Study of Six Districts in Guangzhou	50/
Yudong Lin, Hao Huang, Xinyue Gu, Yuanyi Xie, Jiayue Li, and Chengfang Wang	1J7 4

The Antecedents of Villagers' Initial Trust in the Developer in Urban Village Redevelopment Project608
Yousong Wang, Yao Yao, Yangbing Zhang, Zhibiao Hao, and Hui Yan
Research on the Impact of Working Capital Management Efficiency on Enterprise Performance of Listed Real Estate Companies
Evolutionary Game Analysis of Developers Participating in the Construction of Rental Housing
Research on Urban Land Resource Management and Development Based on Territorial Space Planning System
Dynamic Game Analysis of Land Development and Utilization Planning Supervision under Supply Side Reform
Exploring the Application of PPP Model in the Renewal of Old Residential Areas: Taking Z District as an Example
Environmental Impacts of Residential Satisfaction of Elders in Micro-Regeneration Communities Based on PLS-SEM
A Framework for Measuring the Degree of Citizen Participation in Urban Village Reconstruction Projects
Construction Enterprises and Project Management
Analysis Framework for Digital Economy Innovation Level of Construction Enterprises
Research on Analysis and Control of Responsibility Cost Factors of Engineering Project Based on PDCA
Research on Risk Sharing of EOD+PPP Project

Executive Promotion Incentives and the Effectiveness of Internal Control of Construction Listed Companies 70
Control of Construction Listed Companies709 Shichang Ma and Tingting Li
Research on the Construction Safety Accident Analysis Model of
Deep Excavation Project Caused by Rainstorm71
Junfang Rao, Wei Chen, Weihua Zeng, Daoyuan Guo, and Yishuai Tian
A CBR Model for Analyzing the Social-Capital Side Profitability of PPP Project72
Xuteng Lu, Hang Yan, and Yong Wang
Performance Evaluation of Sponge City Construction in a Residential Project73:
Mengwei Wu, Sihan Yi, Junwu Wang, and Han Wu
Influence of Risk Allocation on Construction Project Management
· · · · · · · · · · · · · · · · · · ·
Performance: The Mediating Effect of Contractor's Performance Behavior74 Yazhuo Luo, Yuanze Chen, and Anqi Feng
raznuo Luo, ruanze Chen, and Anqi Feng
The RS-CBR Model for Estimating Safety Construction Cost of
Engineering Project75
Guodong Yin, Shiying Deng, Wei Chen, and Zheng Duan
Research on the Information Price Measurement of Commercial
Concrete Based on FAHP-BP Method75
Qi He, Zhao Ming, Jichao Xu, and Yunpin Hu
Study on Sponge City Construction Scheme Based on the AHP:
Take Tianjin as an Example76
Lipeng Wei and Xueshan Sun
Experig Wer and Adecisian Sun
Influencing Factors of Online Learning Satisfaction of University
Students in the Post-Covid-19 Era in China775
Xiaodong Yang, Jiayu Zhang, Kailun Feng, Xiaolin Yang, and Tao Yu
Application of Grey Theory Model in Engineering Cost78
Xu Hu
Research on the Development Path of Cost Consulting Enterprises under
Whole-Process Engineering Consultancy792
Qian Zhai, Hongbing Li, Kanghui Lv, and Yahui Qin
Research on the Prediction and Mechanism of Exhibition Scale Based on
Grey Prediction80
Cong Du, Dingcheng Wei, Xiuxiu Bai, Xin Li, and Yulong Li

Entertainment Space Design Based on Behavior Scene Theory: Taking Theme Park Space as an Example809
Fengde Guo, Lin Lin, and Shuangyi Wu Research on the Strategic Human Resource Management Transformation of State-Owned Construction Enterprises in the
New Era815 Zhenxiang Shi
Obstacles and Countermeasures about the Professional Development of the New Generation of Construction Workers in Northern Jiangsu Province
Ontology-Based Integrated Cost Management System for Real Estate Development
Impact of Strategic Alliance Partnership Selection on Its Performance
An Empirical Study on the Impact of Strategic Alliance Partnership Selection on Alliance Performance: The Mediating Role of Alliance Trust867 Yan Yu and Bilin Shi
Study on the Application of Weaving Construction in Western Hunan Province Traditional Dwellings: Taking Fenghuang County as an Example