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Sustainable Construction and Prefabrication

Edited by
Yaowu Wang; Yimin Zhu;
Geoffrey Q. P. Shen; and

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Preface

We would like to welcome you to the 2018 International Conference on Construction and Real Estate Management (ICCREM 2018). Harbin Institute of Technology, Louisiana State University, Hong Kong Polytechnic University, University of Alberta, Luleå University of Technology, Heriot-Watt University, Marquette University, Karlsruhe Institute of Technology, Guangzhou University. The Conference is a continuation of the ICCREM series which have been held annually since 2003.

The theme for this conference is "Innovation Technology and Intelligent Construction". It especially highlights the importance of innovation technology for construction engineering and management. The conference proceedings include 138 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:

- Innovative Technology and Intelligent Construction
- Sustainable Construction and Prefabrication
- Analysis of Real Estate and Construction Industry
- Construction Enterprises and Project Management

On behalf of the Construction Institute, the American Society of Civil Engineers and the 2018 ICCREM Organizing Committee, we welcome you and wish you leave with a wonderful experience and memory at ICCREM 2018.

Professor Yaowu Wang
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Contents

Research on Hoisting Sequence Controlling during Assembly Construction 1
Zhenmin Yuan and Yaowu Wang

A Primary Study of Environmental Impact Assessment for RC Column Using Ontological Theory 7
Bingqing Zhang, Xiaodong Li, and Jun Xiao

The Relationship between Corporation's Profitability and Eco-Innovation: Empirical Evidence from China 14
Hongtao Yang, Yimin Zhu, and Guijun Li

The Application of Building Information Modeling in Sustainable Construction: A Literature Review 21
Shiwei Chen, Kailun Feng, and Yaowu Wang

Review of Green Retrofit Technologies and Policies for Aged Residential Buildings in Hong Kong 38
Yongtao Tan, Guo Liu, Yan Zhang, Chenyang Shuai, and Geoffrey Qiping Shen

Assessment of Sustainable Development Capacity of Prefabricated Residential Building Supply Chain 45
Kangning Liu and Shoujian Zhang

Study on the Interactive Relationship between Prefabricated Buildings and Sustainable Affordable Housing Construction 59
Zhenzong Zhou and Yaowu Wang

Decision-Making in Green Building Investment Based on Integrating AHP and COPRAS-Gray Approach 65
Yan Zhang, Yongtao Tan, Nan Li, Guo Liu, and Ting Luo

Promotion Strategy of Prefabricated Building Based on Evolutionary Game Theory among Main Participants 72
Shuaishuai Jiao, Shoujian Zhang, and Xiying Zhang

A Robust Optimization Approach to the Regional Construction and Demolition Waste Reverse Logistics Network Design 80
Chenxi Yang and Jianguo Chen

Analysis of Factors Influencing the Application of Prefabricated Concrete Structure Based on Structure Equation Modeling 87
Xiangkun Qi, Yaowu Wang, and Chengshuang Sun

Supervision and Punishment Mechanism of Construction Waste Illegal-Dumping Based on Game Theory Approach 97
Chunxiang Hua, Jianguo Chen, and Chenyu Liu

Research on Factors Affecting the Life-Circle Cost of Prefabricated Building in China 106
Qian Jin, Chengjie Xu, and Xiaoxi Liu

A Study on the Stakeholder Influences during Green Building Operation in China 114
Hongyang Li, Yuan Fang, and Hui Yan

Real-Time Carbon Emissions Monitoring Tool for Prefabricated Construction: An IoT-Based System Framework 121
Chao Mao, Xingyu Tao, Hao Yang, Rundong Chen, and Guiwen Liu

Factors Affecting the Capital Cost of Prefabrication in China: Perception and Practice 128
Hong Xue, Shoujian Zhang, and Yikun Su

"Energy-Economic-Environment" Assessment for Energy-Efficiency Techniques of Green Buildings 146
Xiao Xu and Yuan Chang

Game between Government and Developers under the Subsidy Policy of Prefabricated Buildings 153
Xiying Zhang, Shoujian Zhang, and Shuaishuai Jiao

Measurement and Influencing Factors Analysis of PM10 Emissions in Construction Site 161
Hui Yan, Guoliang Ding, Yan Zhang, Xuhui Huang, Yousong Wang, and Hongyang Li

Lean Construction Management in the Construction of the Whole Life Cycle of Use 172
Wei Wang and Xin Zhang

Research on the Development Trend and Methods of Green Construction in China 183
Zehui Miao and Ling Li

Research on a Calculation Model and Control Measures for Carbon Emission of Buildings 190
Juanjuan Shen, Xiuqin Yin, and Quan Zhou

Evaluation of Road Transportation Sustainability 199
Yudan Dou, Zebin Zhao, Xiaolong Xue, Ting Luo, and Ankang Ji

The Development Strategy of Prefabricated Construction Component Factory from the Perspective of Supply Chain **206**
Qiyu Shen and Mingyuan Qi

Analysis of Factors Affecting PC Component Cost Based on System Dynamics **214**
Can Yu, Xiaolin Yang, and Yumei Chen

Main Obstacles to Prefabricated Construction: The Contractor's Perspective in China **220**
Fanning Yuan

A Method for Estimation of the On-Site Construction Waste Quantity of Residential Projects **225**
Jiawei Liu, Jianguo Chen, and Kewei Tang

Identifying Chinese Government's Concerns about Environmental Effects of Highway Construction: A Text Mining Approach **232**
Liu Wu, Kunhui Ye, Hang Yan, and Tingting Yang

Development and Technique Application of Green Building for Hot Summer and Cold Winter Climate Zone: Based on a New Wall Technology **239**
Buchen Wu and Xiaoqing Ge

Sustainable Land Development of Guangzhou City: Based on Urban Carbon Metabolism **249**
Xuezhu Cui and Yunyu Feng

Development Strategy of the Prefabricated Concrete Enterprises Based on SWOT-AHP in China **258**
Lianbo Zhu, Zhenqun Shi, Xu Meng, and Yilei Huang

Analysis of the Influence of Building Design Parameters on Building Energy Consumption Based on GBS: Taking a Campus Office Building in Guangzhou as an Example **269**
Taotao Mo, Huiyan Liu, and Hui Yan

An Improved Case-Based Reasoning (CBR) System for Supporting Green Building Design **279**
Hang Yan, Ya Wu, and Mingxue Ma

Analysis of Green Housing: A Case Study of Blue Diamond Manor in Linyi **286**
Zhongxiu Liu

Research on Hoisting Sequence Controlling during Assembly Construction

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ABSTRACT

Due to increasingly complex structures and higher prefabrication rates, the hoisting order of precast components in fabricated buildings is gradually getting attention. During the assembly construction forbidding precast components on site, there are some influencing factors that interfere with the smooth implementation of a hoisting sequence scheme. This paper identifies and analyzes these factors through literature method, on-site investigation, and expert interview to establish an index system affecting the changes of a hoisting sequence scheme. Then, the index system is illustrated through a case, and the results show that the changes of a hoisting sequence scheme caused by transportation management are more than those caused by construction site management. Finally, this paper also discusses some influencing factors that affecting the changes of a hoisting sequence scheme in the premise of allowing precast components to be stacked on site.

INTRODUCTION

In recent years, policies and norms related to prefabricated buildings are constantly being enacted in succession (Wang 2016). Due to the active promotion of relevant state departments, prefabricated buildings have developed rapidly, such as increasingly complex structures, higher prefabrication rates, more prefabricated factories, and increasing market share (Ding et al. 2016). It is good for the construction industry to shift from extensive construction to lean construction. However, with the development of prefabricated buildings, some problems also begin to gradually emerge, such as the hoisting sequence controlling problem. A clear and reasonable hoisting sequence scheme is conducive to normalize the operation activities of relevant construction workers, reduce the difficulty of on-site construction management, and make all relevant work in an orderly manner, which are good for the overall construction progress, cost, quality, safety, etc. If the scheme is changed during construction, it will affect the original goal and bring chaos to relevant construction workers on site.

Effective control is beneficial to reduce scheme changes and their adverse effects. It is a goal-oriented action that needs to identify controlled plant and controller (Yang et al. 2016). The development of control theory has experienced three important stages: traditional control theory, modern control theory and large-scale systems control theory (Zhang 2006). Wu summarizes the two methods about control theory research, namely precise mathematical analysis method and mechanism construction test method (Wu 2014). So far, some control theories and methods have been applied in the field of prefabricated buildings, and some scholars have also carried out relevant research. These studies mainly focus on the following aspects: progress control (Jiang et al. 2017; Chen et al. 2017a), cost control (Chen et al. 2017b; Zhang et al. 2017a), quality control