



ISS '2011

October 28-30, 2011, Xiamen, China



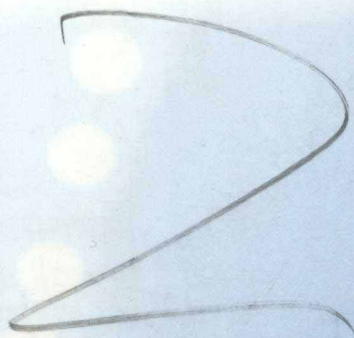
Innovation & Sustainability of Structures

Proceedings of the International Symposium on Innovation & Sustainability of Structures in Civil Engineering

Edited by

Jie Li
Ying Lei
Zhishen Wu
Ruifeng Liang

Volume 2



SOUTHEAST UNIVERSITY PRESS



Innovation & Sustainability of Structures

Proceedings of the International Symposium on Innovation & Sustainability of Structures
in Civil Engineering

Volume 2

Edited by

Jie Li, Ying Lei, Zhishen Wu, Ruifeng Liang

Southeast University Press
Xiamen, China 2011

PREFACE

There are great challenges in Civil Engineering and innovation & sustainability of structures in civil engineering have become increasing important themes. In response to these challenges, the International Symposium on Innovation & Sustainability in Civil Engineering is dedicated to promoting related research and practice. As the on-going series symposia which were held sequentially in 2005 (Nanjing, China), 2007 (Shanghai, China) and 2009 (Guangzhou, China), the objective of this symposium (ISISS'2011) is still to provide an international forum for researchers, specialists, professionals and public administrators and for all concerned with the promotion and exchange of information on innovation in civil engineering, especially for sustainability of structures and disaster prevention & mitigation. The symposium is aimed at presenting and publishing the most recent research & development on innovative materials, metrologies and technologies, intelligent structure and monitoring and security monitoring, structural safety and durability, structures and systems with high performance and sustainable capacity. ISISS'2011 is organized by the School of Architecture and Civil Engineering, Xiamen University, and is sponsored by the National Natural Science Foundation of China (NSFC). On behalf of the Organizing Committee of the International Symposium on Innovation & Sustainability in Civil Engineering (ISISS'2011), we would like to welcome professionals involved in the related fields in civil engineering from all over the world to the City of Xiamen in China on Oct. 28-30, 2011 for ISISS'2011.

Xiamen City is at its proximity to the World Heritage Hakka Tulou. An International Workshop on Rammed Earth Materials and Sustainable Structures & Hakka Tulou Forum 2011 is included as a special session of ISISS'2011. This workshop is being organized as the 2nd event of Hakka Tulou Forum Series. The workshop to take place in a city near the Hakka villages offers a unique opportunity for the workshop participants to witness the sustainability of Hakka architecture, look back in order to move forward, and adapt the past for the world to come.

The Proceedings of ISISS'2011 contain the papers of invited keynote and plenary lectures from more than 20 distinguished international experts and technical presentations in 8 professional sessions under the topics of Monitoring, Damage Detection and Identification for Engineering Structures; Structural Seismic Analysis and Seismic-resistant Structural Systems; Composite Structures and RC Structures; Design, Construction and Analysis of Bridge Structures; Disaster Prevention and Mitigation for Civil Structures; Reliability, Probabilistic Assessment and Uncertainty Evaluation; Novel Analytical and Experimental Methods for Civil Structures; and Rammed Earth Materials and Sustainable Structures & Hakka Tulou. The proceedings of

ISISS'2011 highlight the state-of-the-art innovations in these fields.

ISISS'2011 has received enthusiastic responses from the worldwide. More than 220 papers had been submitted to the symposium, and 202 full papers were accepted for publishing in the proceedings, especially more than 20 distinguished international researchers have contributed their papers of keynote and plenary lectures. The final revised papers are from 15 countries and areas such as Australia, Canada, China, Japan, Iran, Italy, Saudi Arabia, Singapore, Sweden, Switzerland, the United Kingdom (U. K.), and the United States of America (U. S. A.).

We would like to express our sincere thanks to all the members of the International Scientific Committee, the International Advisory Committee as well as the Organizing Committee, whose dedication is the key for the success of ISSS'2011, especially some of them who spent so much time and effort in organizing technical sessions and the workshop on Rammed Earth Materials and Sustainable Structures & Hakka Tulou. Thanks are due to all the contributors to the proceedings for their careful preparations of their manuscripts and all the invited keynote and plenary speakers for their special strong support, which make the Proceedings of ISSS'2011 high quality. We gratefully acknowledge the generous funding support from the National Natural Science Foundation of China (NSFC). We sincerely hope that all the participants to ISSS'2011 will have a good opportunity to meet colleagues from the world for technical and scientific discussions and enjoy their stays in Xiamen when attending ISSS'2011.

Prof. Jie Li (Tongji University, China)

Prof. Ying Lei (Xiamen University, China)

Prof. Zhishen Wu (Ibaraki University, Japan)

Prof. Ruifeng Liang (West Virginia University, USA)

August 27, 2011

Organization

Organized by

School of Architecture and Civil Engineering, Xiamen University



Sponsored by

NSFC, National Natural Science Foundation of China



Co-Chairman of Symposium

Prof. Jie Li (Tongji University, China)

Prof. Ying Lei (Xiamen University, China)

Prof. Zhishen Wu (Ibaraki University, Japan)

International Scientific Committee

H. Adeli (USA)

F. Ansari (USA)

J. L. Beck (USA)

S. C. S. Cai (USA)

F. K. Chang (USA)

X. L. Du (China)

Y. Fujino (Japan)

H. Furuta (Japan)

W. R. Habel (Germany)

G. R. Hota (USA)

W. L. Jin (China)

K. Kawashima (Japan)

T. Keller (Switzerland)

V. Kodur (USA)

E. Aktan (USA)

N. Banthia (Canada)

M. W. Braestrup (Denmark)

F. Casciati (Italy)

M. Cheung (HK, China)

D. M. Frangopol (USA)

K. Fukuzawa (Japan)

H. B. Ge (Japan)

Y. J. Ge (China)

H. Hao (Australia)

V. P. Iu (Macau, China)

V. M. Karbhari (USA)

O. Kayali (Australia)

A. S. Kiremidjian (USA)

K. H. Law (USA)
 H. Li (China)
 Z. X. Li (China)
 X. L. Lu (China)
 K. Maekawa (Japan)
 K. Mosalam (USA)
 T. Miyagawa (Japan)
 A. Mufti (Canada)
 J. G. Nie (China)
 J. P. Ou (China)
 S. H. Rizkalla (USA)
 G. B. Song (USA)
 L. M. Sun (China)
 J. Teng (China)
 T. Ueda (Japan)
 B. Wu (China)
 Y. Xiao (China)
 S. Yuan (China)
 Y. F. Zhang (USA)
 X. H. Zhou (China)
 H. P. Zhu (China)

H. M. Koh (Korea)
 A. Q. Li (China)
 H. N. Li (China)
 W. Q. Liu (China)
 J. P. Lynch (USA)
 G. Mancini (Italy)
 U. Meier (Switzerland)
 M. Motavalli (Switzerland)
 K. W. Neale (Canada)
 Y. Q. Ni (HK, China)
 W. X. Ren (China)
 J. P. Ru (China)
 B. F. Spencer Jr. (USA)
 J. G. Teng (HK, China)
 A. Wada (Japan)
 Y. Q. Xiang (China)
 Y. L. Xu (HK, China)
 C. B. Yun (Korea)
 J. X. Zhao (New Zealand)
 F. L. Zhou (China)

International Advisory Committee

A. H-SAng (USA)
 C. N. Chen (Singapore)
 C. K. Choi (Korea)
 M. P. Collins (Canada)
 F. E. I. Hann (Romania)
 R. Knapp (USA)
 H. Krawinkler (USA)
 S. C. Liu (USA)
 H. A. Mang (Austria)
 E. G. Nawy (USA)

Z. P. Bazant (USA)
 Z. Y. Chen (China)
 K. P. Chong (USA)
 L. C. Fan (China)
 M. Ito (Japan)
 J. M. Ko (HK, China)
 G. C. Lee (USA)
 Z. T. Lu (China)
 A. E. Naaman (USA)
 M. P. Nielsen (Denmark)

H. Okamura (Japan)

Q. H. Qian (China)

M. P. Singh (USA)

R. N. Swamy (UK)

G. Tassi (Hungary)

H. Thonier (France)

R. Walther (Switzerland)

L. L. Xie (China)

W. Q. Zhu (China)

S. Otani (Japan)

H. W. Reinhardt (Germany)

K. Stiglat (Germany)

J. Sun (China)

M. S. Tang (China)

T. P. Tassios (Greece)

H. R. Viswanath (India)

Y. Y. Wang (China)

G. F. Zhao (China)

Symposium Organization Committee

Chairman: Y. Lei (China)

Vice-Chairmen: R. F. Liang (USA), S. Z. Lin (China)

Secretary-general: L. J. Liu (China)

Members: Z. Y. Chen, Y. B. Peng, Z. W. Chen, Z. P. Zheng, Q. Gu, Y. Song, R. H. Wang, C. Q. Lin, B. L. Huang

CONTENTS

Keynote and Invited Papers

Seismic Risk Assessments and Risk-Informed Decisions for Major Infrastructure Systems <i>A. H-S. Ang</i>	1
Design Constraints for A Wireless Network Architecture <i>Fabio Casciati and Zhi-Cong Chen</i>	10
Safety Margins of the Capacity of Seismic Control Dampers in Steel Bridges Against Multiple Earthquakes <i>Hanbin Ge and Lan Kang</i>	23
Advanced Fiber Reinforced Polymer Composites for Sustainable Civil Infrastructures <i>Gangarao Hota and Rui-Feng Liang</i>	30
Environmental Factors Influencing the Durability of Concrete Structures in Frost Environments <i>Wei-Liang Jin and Hai-Rong Wu</i>	41
Bricks, Pavers and Ceramics Made with Class F Fly Ash <i>Obada Kayali, Erik J. Severin and Alex Koszo</i>	47
Innovative Design of Vibration Sensitive Buildings <i>C. G. Koh, D. K. H. Chua and S. L. Lee</i>	54
Long-term Wireless Monitoring Systems for the Monitoring of Long-span Bridges <i>Masahiro Kurata, Jerome P. Lynch, Gwendlyn van der Linden, Pat Hipley, Li-Hong Sheng</i>	62
Web Services in Civil and Structural Engineering Simulations <i>Kincho H. Law</i>	71
A Smart Wireless Sensor Network for Structural Damage Detection <i>Ying Lei, Li-Jun Liu, Yong-Qiang Jiang, Yu-Liang Tang and Yu Luo</i>	83
Advances on Stochastic Damage Mechanics of Concrete <i>Jie Li and Xiao-Dan Ren</i>	93
Research and Application of Innovative Fiber Composite Structures <i>Wei-Qing Liu, Hai Fang, Jun Wang, Li Wan and Lu Zhu</i>	105
Performance-based Structural Seismic Analysis of High-rise Buildings <i>Shu-Zhi Lin, Ze-Yao Xu</i>	116
Sustainable Pedestrian Bridge Construction with Materials by Combination <i>Urs Meier, Rolf Brönnimann, Robert Widmann, Andreas Winistörfer and Philipp Irniger</i>	124
Structural Health Monitoring of Supertall Structures: An Engineering Paradigm and Technology Showcase <i>Yi-Qing Ni, Wei-Yang Liao, Yong Xia and Jan-Ming Ko</i>	131
Recent Advances in Wireless Structural Health Monitoring of Civil Infrastructure <i>Billie F. Spencer Jr. and Soojin Cho</i>	143

Assessment Oriented Traffic Monitoring in SHMS <i>Li-Min Sun and Shou-Wang Sun</i>	166
Recent Developments in FRP-based Hybrid Structures <i>Jin-Guang Teng</i>	178
Research on Seismic Failure Mode and Control of High-rise Diagrid Tube Structures <i>Jun Teng, Wei-Liang Guo, Hao Zhang and Zuo-Hua Li</i>	179
Variable Selection in Proportional Hazards Model: Determining Tuning Variable by AUC <i>Wen-Chyi Wang and Grace Yang</i>	189
Advancement of Basalt Fiber Composites Towards Infrastructural Applications <i>Wu Zhishen, Wang Xin, Wu Gang</i>	195
Structural Health Monitoring of Long-span Suspension Bridges: A Test Bed and Settlement Study <i>You-Lin Xu, X. H. Zhang, S. Zhan, H. Y. Tam, X. J. Hong, S. Zhu, Y. Xia, H. Y. Au, L. D. Zhu</i>	214
Nonlinear Restoring Force and Dynamic Loading Identification Approaches for Chain-like MODF Structures by Power Series Polynomial Model <i>Bin Xu and Jia He</i>	226
Quality Assurance Methodology for High-speed Track Inspection Systems <i>Ta-Lun Yang</i>	238
Key Technologies for Civil Engineering Construction of Xiamen Xiang'an Subsea Tunnel <i>Chao Zeng</i>	247
Sensor Degradation and Effect on Structural Health Prognosis <i>Yun-Feng Zhang and Zhen Li</i>	259
Dynamic Analysis of Structures Based on Spectral Element Method <i>Hong-Ping Zhu and Jun-Bing Zhang</i>	268

International Workshop on Rammed Earth Materials and Sustainable Structures & Hakka Tulou Forum 2011 : Structures of Sustainability

Introduction to Rammed Earth and Hakka Tulou Special Session <i>Rui-Feng Liang</i>	281
Translational Research in Mechanics and Materials with Emphases on Sustainability and Durability <i>Ken P. Chong, Jiao-Yan Li, James D. Lee and Shuang-Ling Chong</i>	282
Use of Rammed Earth in Aboriginal Remote Communities of Western Australia: A Case Study on Sustainability and Thermal Properties <i>Daniela Ciancio</i>	291
An Overview of Some Current Recommendations on the Suitability of Soils for Rammed Earth <i>Daniela Ciancio and Paul Jaquin</i>	299
The Distinctions of Architectural Morphology between Tubao and Tulou in Fujian <i>Zhi-Jian Dai</i>	306
The Genes of Tulou: A Study on Preservation and Sustainable Development of Tulou <i>Shaosen Wang, Suyu Li and Shijie Liao</i>	313

A History of Rammed Earth in Asia <i>Paul Jaquin</i>	316
Spatial Order and Typology of Hakka Dwellings <i>Kazutoshi Katayama</i>	323
Traditional Environmental Knowledge in Hakka Weilongwu: From the View of Anthropology of Landscape <i>Hironao Kawai</i>	332
Nondestructive Evaluation of Historic Hakka Rammed Earth Structures <i>Ruifeng Liang, Gangarao Hota, Ying Lei, Yanhao Li, Daniel Stanislawski and Yongqiang Jiang</i>	340
Structural Responses of Hakka Rammed Earth Buildings under Earthquake Loads <i>Ruifeng Liang, Daniel Stanislawski and Gangarao Hota</i>	351
Heaven and Earth in Tulou Design <i>Keith D. Lowe; B. A. Harvard</i>	362
Experimental Study of Cement Mortar-steel Fiber Reinforced Rammed Earth Wall <i>Miao Pang, Shuai Yang and Yongqiang Zhang</i>	367
Environmental Assessment and Preservation for Fujian Hakka Villages <i>Minoru Ueda</i>	373
Sustainable Technology Research and Demonstration Center for Earth Structures <i>Minoru Ueda and Judy Ueda</i>	382
A Report of Contemporary Rammed Earth Construction and Research in North America <i>Bly Windstorm</i>	389
Summary on Technics of Rammed Earth Wall <i>Chengbin Zhou and Yongning Liang</i>	399
<u>Monitoring, Damage Detection and Identification for Engineering Structures</u>	
Data-driven Identification Methodology for Geotechnical Structures Using Long-term Field Datas <i>Hae-Bum Yun, Ganesh Sundaesan, Yoonhwak Kim and Lakshmi N. Reddi</i>	405
Output-Only Modal Parameter Identification Based on Augmented State Space Models <i>Dan Li, Wei-Xin Ren, Yi-Ding Hu</i>	412
FE Model Updating Using Static Strain Based on Virtual Distortion Method <i>Jin-Hui Wei, Wei-Xin Ren, Hua-Ping Wan</i>	418
Structural Damage Detection Using Singular Entropy of Recurrence Matrix <i>Dong Yang, Wei-Xin Ren, Dan Li</i>	424
Ambient Test and Structural Identification of a Long Span Suspension Bridge <i>J. Zhang, J. Prader, F. Moon, A. E. Aktan, and Z. S. Wu</i>	431
ARMA (2, 1) Model Based on Improved EMD for Structural Modal Parameter Identification <i>Chun Fu, Shao-Fei Jiang</i>	438
Comparative Study on Seismic Behavior of Concrete Filled RHS Frame with or without Infill Wall <i>Yingzi Yin, Bin Li and Yan Zhang</i>	444

Iterative Least-square Estimation for Structural Nonlinearity and External Loadings Identification <i>Jia He and Bin Xu</i>	449
Temperature Distribution of Guangzhou New TV Tower Based on Structural Health Monitoring Data <i>P. Zhang, Y. Xia, Y. Q. Ni and W. Y. Liao</i>	455
Active Bolted Connection Performance Monitoring of a Concrete-steel Composite Girder with Piezoceramics <i>Fan Jiang, Bin Xu and G. Song</i>	462
Output-Only Modal Parameter Identification of Bridge Structure Using Sobi Technique <i>Banfu Yan, Yuzhong Huang and Yangxi Liu</i>	468
The Research of Damage Detection of Gird-Slab Composite Bridge Based on Lifting Wavelet Entropy Indexes <i>Zeng-Shou Sun, Ke-Ju Fan, Xu-Guang Yin, Peng-Jie Han</i>	474
Smart-Label-Based Behavior Monitoring IOT System for the Infrastructures under Harsh Environments <i>Zhi Zhou, Shenghua Jiang, Minghua Huang, Jianping He and Jinping Ou</i>	480
Experimental Investigation on Smart Fiber Reinforced Polymer Anchor under Sand Anchorage Environments <i>Minghua Huang, Zhi Zhou, Shuai Yue, Jianping He and Jinping Ou</i>	486
A Distributed Coaxial Cable Sensor for Crack Detection <i>Peng Zhao, Zhi Zhou, Minghua Huang and Jinping Ou</i>	492
Study on Strong Wind Power Spectrum for Coastal Area of East China <i>Hao Wang, Wenping Deng, Zhouhong Zong, Keguan Zou, Aiqun Li, B. F. Spencer</i>	498
Application of Response Surface Methodology in Finite Element Model Updating <i>Hua-Ping Wan, Wei-Xin Ren, Jin-Hui Wei</i>	508
Non-stationary Envelope Extraction of Ambient Vibration Signals Based on Hilbert Transform <i>Yi-Ding Hu, Wei-Xin Ren</i>	514
Integrated Structural Identification and Vibration Control of Large-size Structures under Unknown Excitation <i>Qiushuang Lin, Ying Lei and Zhilu Lai</i>	519
Structural Damage Detection of the SHM Benchmark Problem Using a Two-step Kalman Estimator Approach <i>Ying Lei, Feng Chen and Yongqiang Jiang</i>	526
A New Approach for Integrating Structural Parameters Identification and Semi-active Vibration Control <i>Zhilu Lai, Ying Lei and Qiu-Shuang Lin</i>	532
Non-parametric Identification of Structural Nonlinearity with Limited Input and Output Measurements <i>Ying Lei and Yang Liu</i>	540
Wavelet Transform Based Structural Damage Detection for Sudden Damage Situation <i>Xin Zhao and Wenjian Yang</i>	548

Structural Seismic Analysis and Seismic-resistant Structural Systems

Bridge Deflection Monitoring Using Acceleration Measurements <i>Wei Lu, Ningshou Xu and Tian-Wei Ma</i>	554
A DC-Motor Based Active-Mass-Damper with Wireless Feedback for Structural Control <i>Sara Casciati, Lucia Faravelli and Zhicong Chen</i>	560
Analysis on Energy Demand for Inelastic SDOF Systems under Near-Fault Impulsive Ground Motions <i>Dixiong Yang, Yi Liu and Wei Wang</i>	566
Displacement-Based Seismic Design Method of Steel Moment Resisting Frame <i>Er-gang Xiong, Qian Zhang, Xing-Wen Liang</i>	573
High Temperature Behavior of Serial Isolation System and Fire Protection <i>Yong-Feng DU, Jia-Liang Kou and Weiwei Kou</i>	580
Design, Testing and Anti-seismic Performance Analysis of Buckling-Restrained Braces <i>Zhen-Xing Zhang, Xiang-Liang Ning, Jun Liu, Wen-Bin Li, Yan-Bei Chen, Yu-Xin Hu, Ming-Jie Xu</i>	587
The Anti-seismic Analysis of Lock-up Device <i>Lingjun Kong, Yanbei Chen, Hongxiang Li, Qibin Jiang</i>	592
Seismic Response Analysis of Multi Support Excitations for Asymmetric High-rise Connected Structure <i>Dongya An, Jiahua Zhang</i>	597
A Method for Enhancing the Global Seismic Capacity of High-rise Steel Structures Based on Uniform-damage Seismic Design <i>Aifu Sun, Shuang Hou, Jinping Ou</i>	606
Research on Dynamic Soil-piled RAFT Foundation-Superstructure Interaction <i>Xuezhong Wen and Shouping Shang</i>	617
Experimental Study on Vibration Control of Beams with Viscoelastic Constrained Damping Foil <i>Ying Yu, Bin Xu, Gangbing Song</i>	623
Research on Instable Deformation Characteristics of Rigid Pile Composite Foundation in Saturated Soft Soil <i>Qian Su, Hui-Xing Hu, Bao-Wen Zhang, Miao-Miao Song and Hao Bai</i>	630
Research and Application of Earthquake Simulation Triple Shaking Tables Array at Fuzhou University <i>Fuyun Huang, Jianzhong Li, Baochun Chen, Youqin Lin</i>	635
Seismic Analysis of Long-span Connected Structures under Multi-support and Multi-dimensional Earthquake Excitations <i>Wei Lin, Shanghong Chen, Pengyun Huang</i>	640
Seismic Performance of Partially Prefabricated Laminated Composite RC Walls: Simulations and Experiments <i>Hongmei Zhang, Xilin Lu, Jianbao Li</i>	646
The Study on Seismic Response with Pounding Effect of Continuous Bridges under Longitudinal Excitation of Traveling Seismic Wave <i>Guang-Wei Zhou, Jian-Zhong Li, Chen Chang-Ping</i>	655

Seismic Response of Pile-raft Foundation Constructed in Soft Clay <i>Kang Ma</i>	662
An Assessment Method of High-rise Structural Earthquake Damage Using Measured Floor Acceleration Messages <i>Chunkai He, Jun Teng Zuohua Li</i>	671
Performance-based Seismic Design for Main Structure of Conventional Island in Nuclear Power Plant <i>Yi-Xin Yuan, Xiao-Lei Han, Sheng-Yi Lin, Xue-Ping Peng and Yu Zhou</i>	679
The Effect of the Stiffness of Super-Structures on the Behaviors of Rigid Pile Composite Ground and Raft Foundation <i>Xue-Dan Li, Jing Ji and Fan Luo</i>	685
The Evaluation on Seismic Resistance for a typical Fire Station <i>Jia-Yi Yen and Shengnan Chang</i>	690
The Study of Performance on Base-isolated Design Parameters through Entropy-based Classification <i>Jiayi Yen, Shiuan Wan, Peichung Huang, Hsuhung Cheng</i>	697
Dynamic Mitigation of Three Dimensional Structures with Smart Isolation System <i>Min Si, Bo Chen and Weihua Guo</i>	703
 <u>Composite Structures and RC Structures</u>	
Self-compacting High Strength Recycled Aggregate Concrete for Sustainable Construction <i>Rasiah Sriravindrarajah, Chng-Xian Ming and PekQia Quan</i>	709
Deformation and Stress Redistribution of SRC Columns under Long-term Axial Compression <i>Zhouyi Chen, Yang Wang and Wei Chen</i>	715
Optimization of Properties of Non-dispersible Underwater Concrete <i>Hongmei Hu, Zhixiong Yao, Yao Cheng, Gang Qian, Shaoyin Zeng</i>	721
Universal Superposition Method for Calculating Bending Strength of Unsymmetrically SCC Column <i>Shaoquan Li</i>	731
Shear Behavior of Reinforcement Concrete Beams with Corroded Stirrups <i>Xin Xue, Seki Hiroshi</i>	737
Nonlinear Finite Element Analysis on the Concrete Filled Steel Tubular Column-Beam Joint with Discontinuous Column Tube in Joint Zone <i>Qingjun Chen, Jian Cai, Quan Qian, Xiaodong Xie, Weining Duan, Chun Yang</i>	744
Research on Mechanical Behavior of Pre-Stressed Concrete Girder Transfer Floor Structure <i>Qingzhen Xie, Lan Chen</i>	750
Comments on the Microplane Models for Concrete <i>Jianning Wu and Shilang Xu</i>	755
Behavior of Rust Expansion Cracking of Concrete Deduced by Equivalent Corrosion Products of Steel Bar <i>Yiqiang Xiang, Kun Cheng, Dongmei Guo, Wei Li and Shixu Lin</i>	762
Experimental Studies of Cold-Formed Thin-Wall C-Section Steel-Lightweight Aggregate Concrete Composite Beam <i>Gentian Zhao, Jianhua Liu</i>	769

Flexural Behavior Analysis of Cold-Formed Z Steel Lapped Continuous Purlin <i>Ming Chen, Kai Liu</i>	774
Research on the Stress-Strain Curves of Structural Lightweight Aggregate Concrete <i>Jianwen Zhang, Zhongjun Ma</i>	779
Experimental Study on Dynamic Hysteretic Behavior of RC Shear Walls under Different Loading Rates <i>Ning Xu, Bin Xu, Xiang Zeng and Zhou Jiang</i>	784
Experimental Study on the Behavior of Reinforced Concrete Columns under Static and Dynamic Loads <i>Zhou Jiang, Bin Xu, Xiang Zeng and Ning Xu</i>	790
Research Progress on Durability of Recycled Aggregate Concrete in China <i>Jianzhuang Xiao, Yuhui Fan, Ming Cao</i>	796
An Experimental Study of Thermal Expansion Coefficient of Concrete <i>Jian-Zhuang Xiao, Pu-Jin Wang, Yu-Ching Wu</i>	800
Chemical Shear Strength between HPC and Rolled Steel Plate after Evaluated Temperatures <i>Jianzhuang Xiao, Weiping Zhao, Yong Zhao</i>	805
Damage Model Based Nonlinear Analysis of RC Deep Beam <i>Xiaodan Ren and Jie Li</i>	811
Numerical Simulation of Self-centering Prestressed Concrete Beam-Column Connection with WEB Friction Devices <i>Lianglong Song and Tong Guo</i>	816
Experimental Study on Performance of RC Beams without Stirrups under Various Loading Rates with Falling Weight Hammer <i>Xiang Zeng and Bin Xu</i>	822
Analysis on New Type of High Performance Concrete Composite Anchor Plate by Finite Element Method <i>Xing Zhu, Wanxu Zhu</i>	828
Comparative Study on Corrosion Mechanism of High-strength and General Steel Bars <i>Yanghang Shi, Lidan Yang, Chong Wu</i>	833
Experiments and Analysis on Vibratory Load Influencing the Shear Strength of Red Clay <i>Hua Hu, Xiaozhen Zhou</i>	840
Theoretical Analysis on the Additional Horizontal Restoring Performance of Prestressed Concrete Vertical Member <i>Jingwen Wang, Jianguo Zhang, Zhong Jiang</i>	845
Effect of Fly Ash on Capillarity of Self-Compacting Fly Ash Concrete <i>Jamal M. Khatib, A. Y. Shaaban, Obada Kayali and S. Kenai</i>	850
Waste Foundry Sand Usage in Concrete <i>Jamal M. Khatib, S. Baig, Obada Kayali, S. Kenai and B. Menadi</i>	858
<u>Design, Construction and Analysis of Bridge Structures</u>	
Nonlinear Seismic Response Analysis of a Cable-stayed Bridge <i>Demin Wei, Xiaonan Gao and Peng Kong</i>	864

Sustainable Design in Bridge Engineering <i>Yadong Li, Xun Zhang, Xiaozhen Li</i>	869
FEM Analysis of Mechanical Behavior of P. C. Continuous Curved Box Girder Bridges <i>Shisheng Fang, Kun Zhang, Shaojie Wu, Yaoming Wang, Xiang He</i>	875
Construction of Composite Box-Girder Bridge by Incremental Launching the Corrugated Steel Webs <i>Jun He, Yuqing Liu, Airong Chen and Shaohong Lu</i>	881
Investigation of Structural Behaviors of GFRP Reinforced Bridge Deck under Dynamic Traffic Loads <i>Yu Zheng, Yunfeng Pan and Guoyou Yu</i>	888
Aerostatic and Aerodynamic Stability Analysis of Cable-stayed Suspension Bridge during Deck Erection <i>Xinjun Zhang, Guoning Fu</i>	893
Seismic Response of Three-Tower Self-Anchored Suspension Bridge with Sliding Saddle <i>Chao Zhang and Zhenzheng Fang</i>	899
Urban Building Vulnerability Analysis and Disaster Mitigation Application Research Based on GIS Technique <i>Xinghai Dang, Xueping Wang, Junming Hao, Yuming Wei, Yuli Yang, Runting He</i>	906
Seismic Assessment of Pile Shafts of Shuhe Bridge in Liquefiable Soils <i>Lin Liu, Xuefeng Zhang and Qingshan Yang</i>	911
Performance of a New Highway Bridge under Near-Fault Ground Motions <i>Lin Liu, Huayu An and Yingyong Li</i>	918
Experimental Research on Model of CFRP Tied Boxed Steel Arch Bridge <i>Qiang Chen, Lingyong Liu, Xianyan Zhou</i>	924
Parameter Analysis of Prestressed Beam Bridges Construction Elevation control on Highspeed Railway <i>Qinglei Jun</i>	929
Simulation Study on Oblique Collision Inner Box of the Double-decked Continuous Box Girder Bridge <i>Zhengfeng Shen, Shen Chen</i>	935
The Behavior of Steel Orthotropic Bridge Deck under Wheel Load <i>Chunsheng Wang, Zhuoya Yuan, Tao Zhang and Bingning Fu</i>	941
Adaptability Analysis On present China Highway Bridge Design Vehicle Load <i>Chunsheng Wang, Yujiao Wang, Kai Xu and Lan Duan</i>	946
Innovative Research of High Performance and Sustainable Steel Bridges <i>Chunsheng Wang, Lan Duan, Jingwei Zhu and Xinxin Wang</i>	951
Static Behavior of Long-span RC Cable-Stayed Bridge with FRP Cables <i>Xin Wang, Fan-Xing Zeng and Zhi-Shen Wu</i>	957

Disaster Prevention and Mitigation for Civil Structures

Dynamic Collapse Analysis of Steel Framed Roof Structure under Transient Wind Loading and Robust Enhancement Technique <i>Yunfeng Zhang and Linjia Bai</i>	965
--	-----

Study of the Blast Resistance Capacity of a New Multi-Arched Door Panel <i>Wensu Chen and Hong Hao</i>	971
Application of Equivalent Beam-column Method to Prediction of Ultimate Strength of CFST-CSW Arch <i>Jing Gao, Baochun Chen</i>	978
Application of a New Double-arch-support Structure in a Long-span Space Structure <i>Wenbo Sun, Jianwen Wang, Ting Deng, Junyi Jiang, Weixing Zhou, Can Cui</i>	984
Research of Stiffness Performance of Truss String Structure of a Large-span Roof Structure <i>Wen-Bo Sun, Wei Huang</i>	989
Analysis of Wind-induced Vibration Response of Beam String Structures <i>Zhengrong Jiang, Peng Kong and Xiaonan Gao</i>	994
Experiment of Water Pipeline Considering Leakage <i>Wei Liu, Luna Huang and Jie Li</i>	1002
Experimental Study on Detecting Broken Wires in Stay Cables Based on Magnetostrictive Effect <i>Aimin Yuan, Xiaowen Zhu, Yuanhua Zhou</i>	1008
The Influence of Local Column Failure on Overall Performance of Reinforced Concrete Frame Structures <i>Yuedong Sun, Yuming Lin</i>	1014
Experiment Study on Aseismic Behaviors of Chinese Ancient Structure Strengthened by Steel Components <i>Qian Zhou, Wei-Ming Yan</i>	1020
Shaking Table Tests of a Free-Standing Cultural Relic Strengthened by Nylon Lines <i>Qian Zhou, Weiming Yan, Jinbao Ji, Jingnan Zhou</i>	1027
Stability Analysis of Bending Damaged Columns of Light-weight Steel under Elevated Temperatures <i>Shi Yan, Peng Li, Baoxin Qi, Lei Liu, Zhiqiang Xin</i>	1034
Application of Xigeda Soil and Rock Mixture Materials in Subgrade Embankment <i>Tao Jiao, Wei Chen, Xuwei Li and RenFeng Li</i>	1041
Experimental Study on the Plant-growing Properties and Application Benefits Analysis of Macroporous Concrete without Sand <i>Yi Xing, Limei Wang</i>	1048
Research and Application of Structure Health Monitoring System in Long-span Spatial Structure <i>Qian Liu, Liang Ren, Hongnan Li, Dongsheng Li</i>	1053
Numerical Simulation of CFRP Strengthened Perforated Masonry Walls under Blast Loading <i>Yurong Guo, Hong Zheng</i>	1060
Finite Element Analysis on Steel Silo Reinforced with CFRP <i>Zhiyong Yang, Song Zhao, Jun Hu, Zengchan Lu</i>	1065
Stage Risk Forensic on Large-scale Public Projects' Life-Cycle <i>Li Lin, Weidong Zhuo, Lichu Fan</i>	1070

Experimental Study on Concrete Columns Confined by BFRP-PVC Tubes under Uniaxial Loading	1076
<i>Shaofei Jiang, Tianjie Dai and Zhilin Wu</i>	
Study on the Systematic Setting Method for Urban Disaster Prevention Sign and Their Identification with High Efficiency	1082
<i>Bo Song, Yang Chen, Shu Jia</i>	
Static Analysis of Axial Ultimate Bearing Capacity of Single Pile in Different Diameter and Soil Layers	1088
<i>Long Binghuang, Kesete Gebreslasie Gebremariam</i>	
Strengthening of Seismically-deficient RC Beam-column Exterior and Interior Joints Using CFRP Composites	1095
<i>Saleh Alsayed, Nadeem Siddiqui, Yousef Al-Salloum, Tarek Almusallam</i>	
Numerical Simulation Analysis of Road Tunnel Fire under Different Types of Fire Growth Rate	1102
<i>Fengqing Cui, Xin Han and Beihua Cong</i>	
Parametric Study of Multi-arched Double-layered Panel under Blast Load and Its Optimal Application in Blast Door Design	1108
<i>Wensu Chen and Hong Hao</i>	
Using Fiber Bragg Grating Sensors to Measure Corrosion of Steels in Concrete—Lab Experimental Test and In-field Application	1115
<i>Zhupeng Zheng, Hongcheng Huang and Ying Lei</i>	
The Impact of Topography and Geology on the Sediments in the Upstream of the Kao-Ping Catchment	1122
<i>K. J. Shou, L. Y. Fei, M. M. Chen, C. Y. Wei, C. Y. Hung, Y. T. Huang</i>	
Durability of Wet Lay-up FRP Composites and Their Epoxy Reins in Alkaline Environment	1129
<i> Jiawei Shi, Hong Zhu, Zhishen Wu and Gang Wu</i>	
Experimental Study on RC Beams Strengthened with Prestressed Interval Impregnated Hybrid Carbon/Basalt Fiber Sheet	1136
<i>Shenyin Yang, Shengze Yang, Wenjun Jing, Zhishen Wu, Gang Wu</i>	
Novel Analytical and Experimental Methods for Civil Structures	
A Non Contact Displacement Measurement System Based on Vision System	1142
<i>Fabio Casciati, Lijun Wu</i>	
Multi-Resolution Wavelet Analysis for Impact-induced Damage Detection: Experimental Study	1148
<i>Songye Zhu, Youlin Xu, Xiao-Hua Zhang and Sheng Zhan</i>	
A Hermite Reproducing Kernel Approach for Stability Analysis of Thin Beam	1155
<i>Huikai Peng and Dongdong Wang</i>	
An Assumed Strain Method for Isogeometric Finite Element Modeling	1161
<i>Hanjie Zhang and Dongdong Wang</i>	
Research on the Local Load-Buckling Capacity of the Coped Steel I-Beam	1167
<i>Ling Wang, Lan Chen, Wenqing Tu</i>	
A Simplified FEM Analysis Method for Arc Member with Small Ratio of the Arc's Height to the Length of Chord	1172
<i>Wenbo Sun, Wei Huang</i>	