

Preface

The joint conference of 2012 Global Conference on Civil, Structural and Environmental Engineering and the 3rd International Symposium on Multi-field Coupling Theory of Rock and Soil Media and Its Applications was taken place in Yichang, China, in October, 2012. The combined conference is organized by China Three Gorges University, Geoenvironmental Engineering Branch of Chinese Society for Rock Mechanics and Engineering, The Ground Rock Engineering Committee of Chinese Society for Rock mechanics and Engineering, The Fluid Mechanics Committee of the Chinese Society of Mechanics, and Hubei Society for Rock Mechanics & Engineering. The aim of the conference is to create a venue where researchers from around the world can reflect on progress made in the scientific study in civil and environment field.

All papers included in this book have been peer reviewed through processes administered by the scientific committee before accepted for publication. These papers recorded valuable explorations of the authors in relative fields of geological and geotechnical engineering, structural engineering, reliability, durability and rehabilitation of structures, monitoring and control of structures, tunnel, subway and underground facilities, road and railway engineering, bridge engineering, seismic engineering, hydraulic engineering, water supply and drainage engineering, heating, gas supply, ventilation and air conditioning works, natural and technogenic disasters prevention and mitigation, surveying engineering, cartography and geographic information system, multi-field coupling theory and its applications, applied and computational mechanics, noise and vibration control, computer applications in industry and civil engineering, and engineering management.

We are grateful to all the authors, referees and organizations who have made these volumes possible and hope that it becomes an invaluable reference both for the civil and environmental engineering profession.

The editors

**The 2012 Global Conference on Civil, Structural and
Environmental Engineering
&
The 3rd International Symposium on Multi-field Coupling Theory
of Rock and Soil Media and Its Applications**

Organized by:

China Three Gorges University

Geoenvironmental Engineering Branch, Chinese Society for Rock Mechanics and Engineering

The Ground Rock Engineering Committee, Chinese Society for Rock mechanics and Engineering

The Fluid Mechanics Committee of the Chinese Society of Mechanics

The Hubei Society for Rock Mechanics & Engineering

Hosted by:

China Three Gorges University

Key Laboratory of Geological Hazards on Three Gorges Reservoir Area, Ministry of Education

Hubei Three Gorges Reservoir Area Landslides Observation and Research Station

Southwest Petroleum University

Northeast Petroleum University

Wuhan Polytechnic University

Hubei Polytechnic University

CnTech, Co., Ltd.

Conference Organization

Honorary-Chairs:

Academician Prof. Qihu Qian, Chinese Academy of Engineering

Academician Prof. Sijing Wang, Chinese Academy of Engineering

Academician Prof. Yingren Zheng, Chinese Academy of Engineering

Chairman

Prof. Jianlin Li, China Three Gorges University

Co-Chairmen

Prof. Runqiu Huang, Chengdu University of Technology

Prof. Chuangbin Zhou, Wuhan University

Prof. Weiya Xu, Hohai University

Prof. Faquan Wu, Institute of Geology and Geophysics, CAS

Prof. Bin Tian, China Three Gorges University

Prof. Peng Cui, Institute of Mountain Hazards and Environment, CAS

Prof. Jinzhou Zhao, Southwest Petroleum University

Prof. Kaoping Song, Northeast Petroleum University

Prof. Xiangui Liu, Institute of Porous Flow & Fluid Mechanics, CAS

Prof. Bing Liang, Liaoning Technical University

Prof. Yangsheng Zhao, Taiyuan University of Technology

Scientific and Technical Committee

Prof. Paulo J.M. Monteiro, University of California-Berkeley
Prof. Daniel M. Tartakovsky, University of California-San Diego
Prof. Dave Chen, University of Alberta
Prof. Yujun Cui, Ecole des Ponts-ParisTech,UR Navier/CERMES
Prof. Jianfu Shao, French National University of Lille
Prof. Shimei Wang, China Three Gorges University
Prof. Hongxia Wang, Three Gorges Vocational College of Electric Power
Prof. Shangqing Wang, China Three Gorges University
Prof. Wang Qing, Jilin University
Prof. Wang Yuan, Hohai University
Prof. Yingfa Lu, China Three Gorges University
Prof. Changfu Wei, Institute of Rock and Soil Mechanics, CAS
Prof. Wennian Xu, China Three Gorges University
Prof. Wangcheng Zhu, Northeastern University
Prof. Yikun Liu, Northeast Petroleum University
Prof. Jianjun Liu, Southwest Petroleum University
Prof. Xiang He, Wuhan Polytechnic University
Prof. Tianhong Yang, Northeast Petroleum University
Prof. Zhaoping Meng, China University of Mining and Technology
Prof. Xiangyang Chen, Three Gorges Vocational College of Electric Power
Prof. Hongkai Chen, Chongqing Jiaotong University
Prof. Ling Yu, Jinan University
Prof. Jicheng Zhang, Northeast Petroleum University
Prof. Hong Zheng, Institute of Rock and Soil Mechanics, CAS
Prof. Yihong Zhou, China Three Gorges University
Mr. Shaolin Zhou, Manager, CnTech Co., Ltd
Prof. Kaixiang Xu, China Institute of Geo-Environment Monitoring
Prof. Jianyi Yan, Hubei Polytechnic University
Prof. Junrui Cai, Xian University of Technology
Prof. Xuebin Huang, China Institute of Geo-Environment Monitoring
Prof. Kunlong Yin, China University of Geosciences
Prof. Shengguo Cheng, China Three Gorges University

Prof. Tao Cheng, Hubei Polytechnic University

Prof. Tingyao Jiang, China Three Gorges University

Prof. Chunsheng Pu, Southwest Petroleum University

Prof. Qiang Xue, Institute of Rock and Soil Mechanics, CAS

Prof. Weiguo Liang, Taiyuan University of Technology

Executive chairman

Prof. Guodong Zhang, China Three Gorges University

Conference Secretariat

Lehua Wang, China Three Gorges University

Zhenghua Zhang, China Three Gorges University

Youjun Ji, Southwest Petroleum University

Hongjun Yin, Northeast Petroleum University

Li Liu, Percolational Fluid Mechanics Research Institute of CAS

Haijun Lu, Wuhan Polytechnic University

Xiaolan Huang, Wuhan Polytechnic University

Dong Yang, China Three Gorges University

Fang Liu, China Three Gorges University