

# **2009 International Conference on Engineering Computation**

**(ICEC 2009)**

**Hong Kong, China  
2 – 3 May 2009**



**IEEE Catalog Number: CFP0978G-PRT**  
**ISBN: 978-1-4244-4144-0**

# 2009 International Conference on Engineering Computation

## ICEC 2009

# Table of Contents

### Preface

### Organizing Committee

---

### Theory and Technology

Unstrained Installation of Hangers and Optimal Calculation of Self-Anchored Suspension Bridge .....	3
<i>Xu-ming Song and Gong-lian Dai</i>	
Time-Dependent Analysis of Steel-Concrete Composite Beams .....	8
<i>Meng Jiang, Wenliang Qiu, and Zhe Zhang</i>	
The Research on Comprehensive Evaluation System of Underground Space Thermal Comfort Environment .....	12
<i>Yanqiang Di, Qian Xie, Yu Zhao, and Dachao Zou</i>	
Study on the Quantitative Evaluation of Underground Space's Air Quality .....	17
<i>Yanqiang Di, Tao Huang, Yu Zhao, and Qian Xie</i>	
Study of Horizontally Homogeneous Atmosphere Boundary Layer Based on Standard k- $\epsilon$ Model .....	21
<i>Jian Zhang and Qing-shan Yang</i>	
Study of Ground Settlement of Tunnel Shield Construction in Loess Area .....	25
<i>Yuchao Chen and Lu Wang</i>	
Strategy of Energy-saving for Variable-Rate Irrigation Sprinkler .....	29
<i>Xingye Zhu, Shouqi Yuan, Junping Liu, and Yin Luo</i>	
Simulation Study on Human Respiratory System Based on Muscle Pressure Driven .....	33
<i>Zhonghai He</i>	
Simulation and Experiment on Cement Clinker Flowing Law in a New Type Grate Cooler .....	36
<i>Yan Wen and Haibing Li</i>	

Simplified Computational Methods for the Second-Order Internal Force and Displacement of Semi-rigidly Connected Steel Frames .....	40
<i>Yibin He, Pin Huang, Qiaojuan Leng, and Qiongfang He</i>	
Self-Sealing Behavior of High Level Waste Repository in Rock Salt Formation .....	44
<i>Guijun Wang, Chunming Wang, and Kangmei Guo</i>	
Research on Landslide Mechanism Based upon the Geo-material Parameter Identification .....	47
<i>Kang-mei Guo and Jing-lei Liu</i>	
Numerical Simulation of Fluid-Structure Interaction for Wind-Induced Dynamic Response of Jinan Yellow River Cable-Stayed Bridge in Cantilever State .....	51
<i>Ying Zhou, Qi-Lin Zhang, and Zhen-Hua Liu</i>	
Numerical Calculation of Flow Field by Application of Superposition Theory of Partial Differential Equation .....	55
<i>Hong-gang Wang, Jian-rang Zhang, Feng-liang Wu, Hai-fei Lin, and Xin-tan Chang</i>	
Limit Span of Two-Span Self-Anchored Suspension Bridge .....	59
<i>Wenliang Qiu, Meng Jiang, and Baochu Yu</i>	
Free Vibration Analysis of Spatial Curved Beams with Variable Curvature and Torsion .....	63
<i>Li-li Zhu and Ying-hua Zhao</i>	
Fluid-Solid Coupling Seepage-Based Numerical Simulation of Mechanical Oil Expression from Peanut .....	67
<i>Xiao Zheng, Yan You, Guoxiang Lin, Nong Wan, and Yaxin Zhang</i>	
Damage Detection of Guangta Tower Based on Dempster-Shafer Evidence Theory .....	71
<i>Yi-jie Ding, She-liang Wang, Xin-dong Zhao, Rui Gao, and Xiang Zhao</i>	
CFD Study of Power and Mixing Time in a Vessel Agitated by Large Height Diameter Ratio Cylinder Stirrer .....	75
<i>Pan Zhang, Weiwen Wang, Guanghui Chen, and Jianlong Li</i>	
Application of Support Vector Machine for Detecting Rice Diseases Using Shape and Color Texture Features .....	79
<i>Qing Yao, Zexin Guan, Yingfeng Zhou, Jian Tang, Yang Hu, and Baojun Yang</i>	
Analysis on Hinterland Segmentation in Port Project .....	84
<i>Jie Wang and Huaqiang Zhang</i>	
Analysis of Chaos of a 4-Degree-of-Freedom System with Clearance .....	89
<i>Yanzhi Shen, Guojun Du, Hongmin Liu, and Jie Xiong</i>	
A Novel Hybrid Algorithm for the Topology Optimization of Truss Structure .....	93
<i>Renhua Wang, Xianzhong Zhao, and Buying Xie</i>	
A Computational Model for Estuarine Velocity Separation in Yangtze River .....	97
<i>Zhihui Ni and Lichun Wu</i>	

A Brief Implementation Analysis of SHA-1 on FPGAs, GPUs and Cell Processors .....	101
<i>Lin Zhou and Wenbao Han</i>	

## **Applications**

Time-Frequency Analysis of Earthquake Record Based on S Transform and Its Effect on Structural Seismic Response .....	107
<i>Jian Fan and Ping Dong</i>	
The Study on the Real Option Decision-Making Model for Investment Value of Water Project .....	110
<i>Jie Zhang, Lianfen Yang, and Jigan Wang</i>	
The Settlement Analysis of Soft Ground Improved by Vacuum-Surcharge Preloading Method .....	114
<i>Yan-hui Ge, Shu-cai Li, Chuan-fu Li, Guo-fu Sun, and Ming-Bin Wang</i>	
The Numerical Simulation of Spontaneous Combustion of Coalfield Outcrop and Its Application .....	118
<i>Haiyan Wang, Xinquan Zhou, Yu Jiao, and Yulong Duan</i>	
Study on the Deformation and Safety in the Process of Shallow Buried Tunnel Construction .....	123
<i>Jian-Hua Hu, Xi-Jun Yan, Ke-Ping Zhou, and Li-Hong He</i>	
Study on Shear Behavior of Soil-Structure Interface .....	127
<i>Wei Wang and Tinghao Lu</i>	
Spatial Stress Analysis for Complex-Shaped Bridges Based on FEM .....	131
<i>Yang Li</i>	
Simulation Research on Chaos Characteristics of a Class of Macroscopic Traffic Models .....	135
<i>Daijian Ling and Peng Xiao</i>	
Simulation of Individual's Representative Activity-Travel Pattern Based on Cluster Analysis and Monte Carlo Method .....	139
<i>Min Yang, Wei Wang, Xuewu Chen, Xianyao Hou, and Pengcheng Shangguan</i>	
Seismic Response Analysis of Arch Dam with Joints Based on Rate-Dependant Plastic Damage Model .....	143
<i>Jing Li and Jian-yun Chen</i>	
Research on Ductility of Unbonded Partially Prestressed Concrete Beam with High Strength Based on Network Model .....	148
<i>Lili Hu, Ke Wu, and Ming Liu</i>	
Research on Construction Techniques for System Transformation of Self-Anchored Suspension and Cable-Stayed Combination System Bridge .....	151
<i>Yue Xu, Cun-jun Zou, Wan-chun Chen, Peng Liang, and Geng-feng Ren</i>	

Research of Dynamic Response Numerical Simulation Technology about Underground Chamber with Blasting Load in Deep Environment .....	155
<i>Hu Jia and Yang Yin</i>	
Quality Reliability-Cost Optimization of Construction Project Based on Genetic Algorithm .....	159
<i>Yu-fang Shi, Hui-min Li, and Ning Lu</i>	
Practical Design Method of Spherical Shell Concrete Structure .....	163
<i>Yi-li Wu, Ai-min Jiang, and Yi-hong Hong</i>	
The Design of Four-Bar Linkage of Large Inclined Angle Hydraulic Support .....	167
<i>Xin Zhang, Qingliang Zeng, Jianwu Zhang, and Hanzheng Dai</i>	
Numerical Simulation of Methane Accumulation in Roof Falling Zone of Roadway in Coal Mine .....	171
<i>Yingchun Zhu, Xinquan Zhou, Lingqi Zhu, and Haiyan Wang</i>	
Numerical Simulation Modeling and Calculation Analysis on Stope Roof Stability under the Complex Geological Conditions in Deep Mining .....	175
<i>Hua Hu and Yong Cao</i>	
Non-contact Explosion Dynamic Response Analyzing of Vessel Electric Station Structure .....	178
<i>Jing Jin and Xing-yue Wu</i>	
Numerical Analysis of Roughness Effect on Fluid Flow in a Micro Tube with a Three-Dimensional Roughness Element Model .....	182
<i>Dongxing Du and Yingge Li</i>	
Fire Evacuation Underground Space Based on Building EXODUS .....	186
<i>Shu-qing Hao, Hong-wei Huang, Yong Yuan, and Kun Yin</i>	
Finite Element Analysis of Steel-to-Concrete Connections Subjected to Combined Moment and Shear Loading .....	189
<i>Qun Xie, Yaping Peng, and Zhoudao Lu</i>	
Exact Solutions for In-Plane Displacements of Curved Beams under Thermo Load .....	193
<i>X. F. Li and Y. H. Zhao</i>	
Dynamics Simulation and Reconstruction on SL6 Ship Loader Boom Luffing Winch Platform .....	197
<i>Lian-Dong Zhang, Rong Shi, and Cai Liu</i>	
Dynamical Formulation and Analysis of RV Reducer .....	201
<i>YingHui Zhang, JunJun Xiao, and WeiDong He</i>	
Dynamic Response Analysis for Non-smooth Gear Rattling System .....	205
<i>Kai Xu, Jianjun Yang, Xiaozhong Deng, and Jia Ping</i>	
Dynamic Load Sharing Behavior of Planetary Gear Train with Backlashes .....	209
<i>Yan-feng Chen and Xing-yue Wu</i>	
Biaxial Bending Analysis of the Slabs under Concentrated Loads .....	213
<i>Zhang Tao</i>	

Application of Fast Multipole VBEM to Two-Dimensional Potential Problems .....	217
<i>Zhijia Zhang and Qiang Xu</i>	
Analysis of Stability of Dam Slope during Rapid Drawdown of Reservoir Water Level .....	221
<i>Shang-jie Xu, Fa-ning Dang, Qing Han, and Su-zhen Cheng</i>	
A Staggered-Grid High-Order Finite Difference Numerical Simulation for Tunnel Seismic Prediction Ahead of Construction .....	225
<i>Guang-yin Lu, Xu-li Han, and Zi-qiang Zhu</i>	
A Geometrical Analysis of the Avian Influenza Virus at Different Areas .....	229
<i>Yan-ling Yang</i>	
A Displacement-Based Vulnerability Analysis of RC Buildings in SCE .....	232
<i>Zhu Jian and Tan Ping</i>	
<b>Other Papers</b>	
Predicting Ultimate Punching Failure in Concrete Bridge Deck Slabs through Nonlinear Finite Element Analysis .....	239
<i>Zheng Yu, Des Robinson, Su Taylor, and David Cleland</i>	
Study on Evaluating Methods for Time-Dependent Ultimate Bearing Capacity of Single Driven Pile .....	243
<i>Tian Xia and Wei Wang</i>	
Vibration Analysis of the Boiler-Supporting Frame Structure .....	247
<i>Fangfang Wei, Panxiu Wang, Yanhua Wang, and Zhitao Lu</i>	
Quantitative Determination of Fluid Flow Induced Corrosion Rate of an Oil Pipeline .....	250
<i>Joseph I. Achebo</i>	
Research on Dynamic Sensitivity Response of Nonlinear Structures .....	253
<i>Yanli Shen, Qingshan Yang, and Lingyan Xuan</i>	
Computational Analysis of Flow Properties That Could Cause Pipeline Failure .....	257
<i>Joseph I. Achebo</i>	
User Character and Communication Pattern Detecting on Social Network Site .....	261
<i>Lailei Huang and Zhengyou Xia</i>	
The Biological Effects of Low Energy C <sup>+</sup> Ion Implantation on Peanut .....	265
<i>L. Xu, S. M. Ren, P. L. Yang, Y. G. Han, and T. Zhang</i>	
Study on Transpiration Model for Fruit Tree Based on Generalized Regression Neural Network .....	269
<i>XianYue Li, PeiLing Yang, and ShuMei Ren</i>	

## Author Index