2016 International Conference on Civil, Architecture and Environmental Engineering (ICCAE 2016)

Selected, peer reviewed papers from ICCAE 2016

Taiwan-Taipei, November 4-6,2016

Edited by

Wen-Pei Sung

Jimmy C.M. Kao

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Chien-Te Hsieh

Tao-Yun Han

National Chin-Yi University of Technology

National Sun Yat-Sen University

China University of Technology, Taiwan

Yuan Ze University

Taiwan Society of Construction Engineers

Contents List

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Jun-Hong Lin, Nanhua University

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Ting-Yu Chen, National Chin-Yi University of Technology

Preface

The 2016 International Conference on Civil, Architecture and Environmental Engineering (ICCAE 2016) will be held during November 4-6, 2016 in Taipei, Taiwan, organized by China University of Technology and Taiwan Society of Construction Engineers, aim to gather professors, researchers, scholars and industrial pioneers all over the world, ICCAE 2016 is the premier forum for the presentation and exchange of past experiences and new advances and research results in the field of theoretical and industrial experience. The conference welcomes contributions which promote the exchange of ideas and rational discourse between educators and researchers all over the world.

All accepted full papers (presented at the conference and following the conference format) will be published by CRC　Press / Balkema (Taylor & Francis Group) and submitted to Ei Compendex, Scopus, Inspec, DOAJ, CPCI (Web of Science) and CNKI. Selected papers will be recommended for publication in SCI/Ei journals.

- Building and Environment(ISSN: 0360-1323)(SCI&EI)
- Civil Engineering and Environmental Systems(ISSN: 1029-0249)(SCI&EI)
- The IES Journal Part A: Civil & Structural Engineering(ISSN: 1937-3279)(EI)
- Journal of Civil Structural Health Monitoring(ISSN: 2190-5452)(EI)

We think that ICCAE 2016 will be the most comprehensive Conference focused on the Civil, Architecture and Environmental Engineering.. The conference will promote the international academic cooperation and communications, and exchanging research ideas.

We would like to thank the conference chairs, organization staff, authors for their hard work. By gathering together so many leading experts from the Civil, Architecture and Environmental Engineering fields, we believe this conference will be a very enriching experience for all participants. Wish all of you have a productive conference and enjoyable time in Taipei!
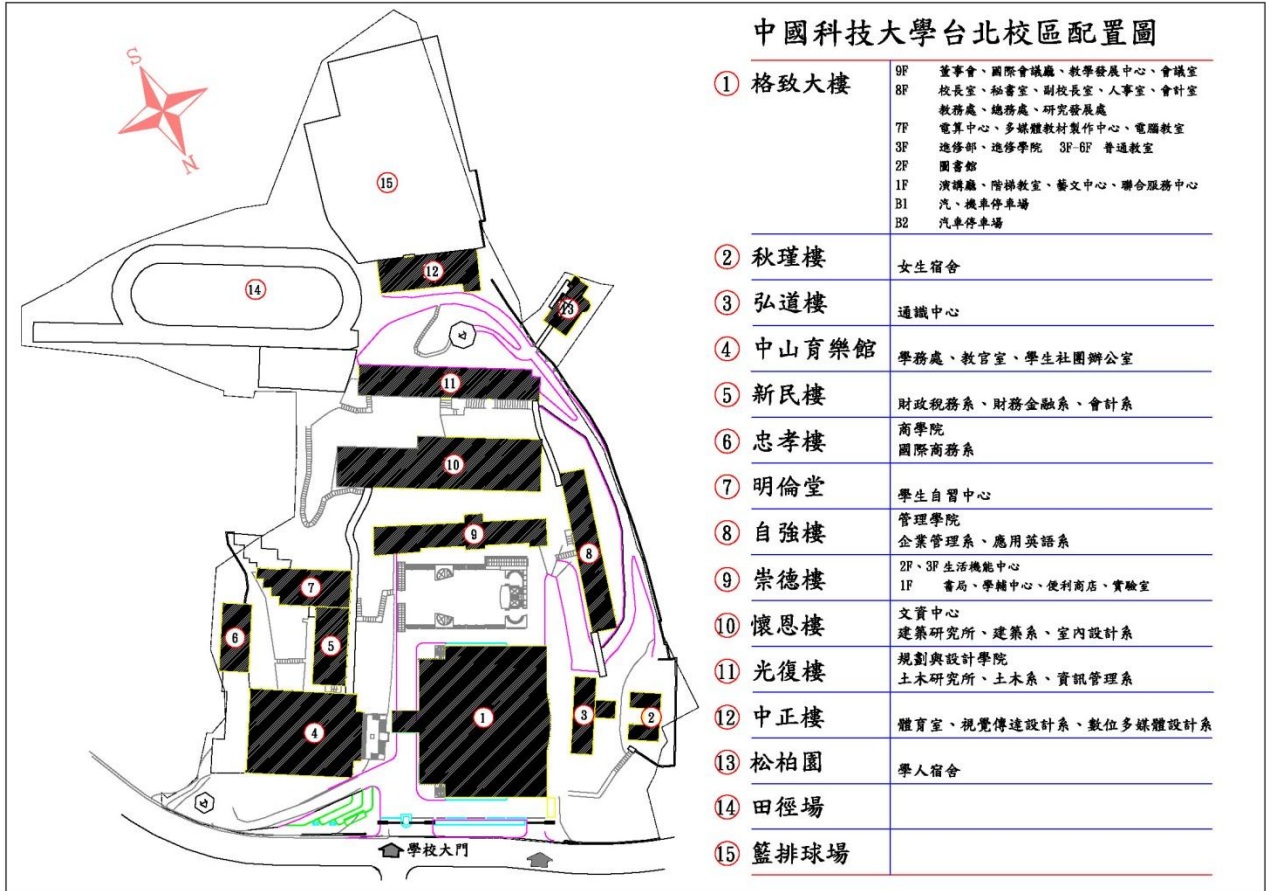
Conference Committees

November 2016

Conference Location

China University of Technology

Address: No. 56, Sec. 3, Xinglong Rd., Wunshan District, Taipei City, Taiwan
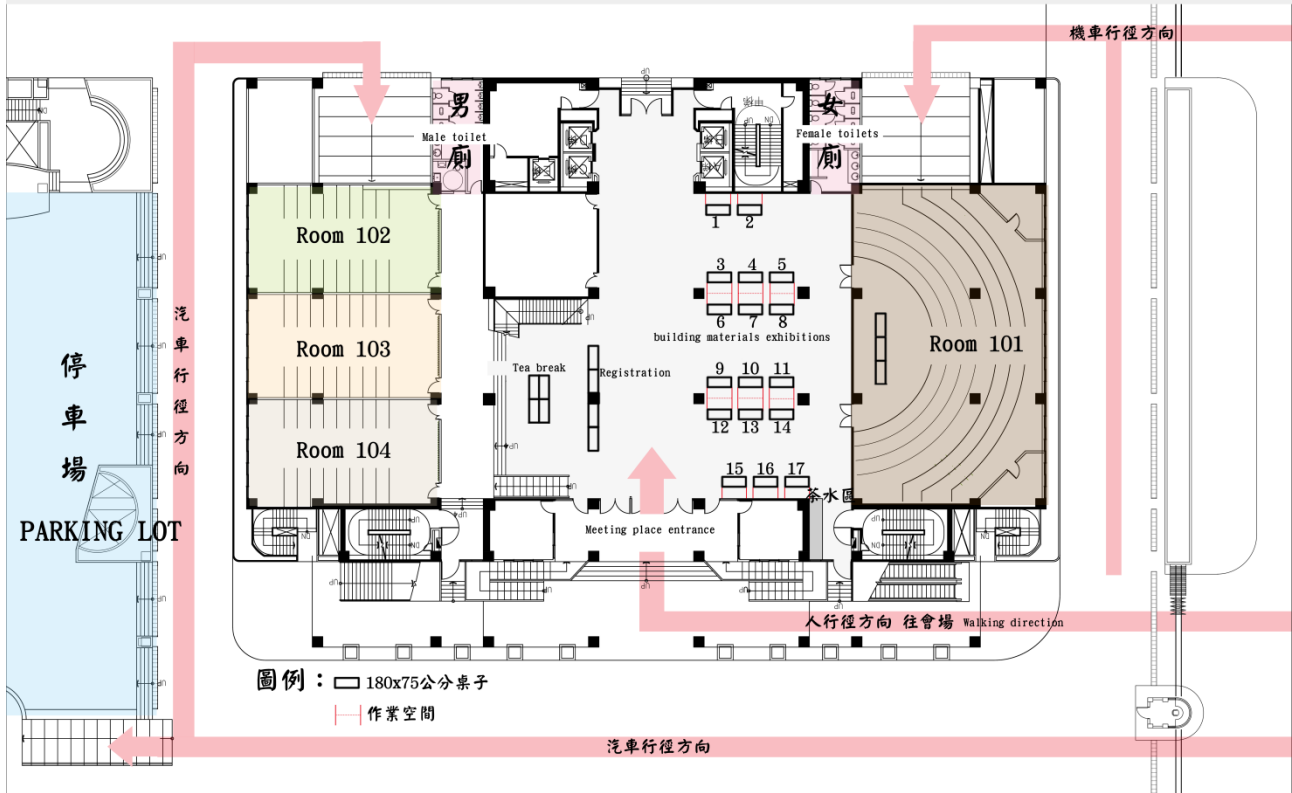
中國科技大學校區平面圖

中國科技大學台北校區配置圖

① 格致大樓	9F	董事會、國際會議廳、教學發展中心、會議室
	8F	校長室、秘書室、副校長室、人事室、會計室 教務處、總務處、研究發展處
	7F	電算中心、多媒體教材製作中心、電腦教室
	3F	進修部、進修學院　3F-6F　普通教室
	2F	圖書館
	1F	演講廳、階梯教室、藝文中心、聯合服務中心
	B1	汽、機車停車場
	B2	汽車停車場

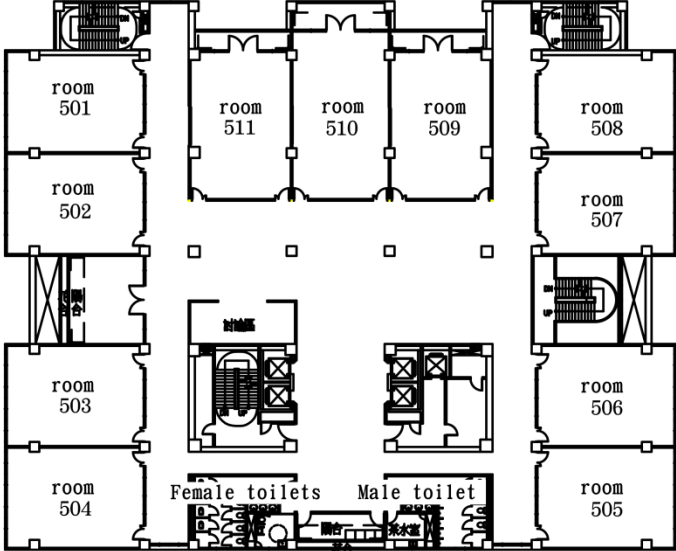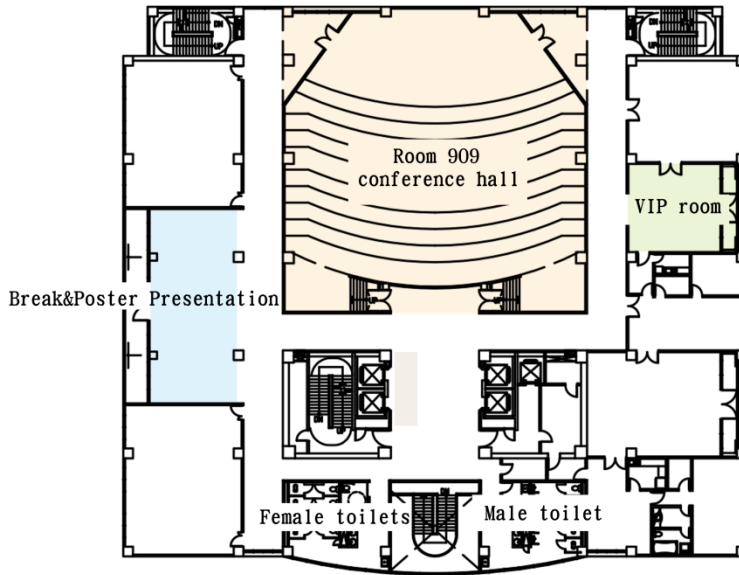| ② 秋瑾樓	女生宿舍
③ 弘道樓	通識中心
④ 中山育樂館	學務處、教官室、學生社團辦公室
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⑦ 明倫堂	學生自習中心
⑧ 自強樓	管理學院 企業管理系、應用英語系
⑨ 崇德樓	2F、3F生活機能中心 1F　書局、學輔中心、便利商店、實驗室
⑩ 懷恩樓	文資中心 建築研究所、建築系、室內設計系
⑪ 光復樓	規劃與設計學院 土木研究所、土木系、資訊管理系
⑫ 中正樓	體育室、視覺傳達設計系、數位多媒體設計系
⑬ 松柏園	學人宿舍
⑭ 田徑場	
⑮ 籃排球場	

格致樓一樓平面圖

2016 International Conference on Civil, Architecture and Environmental Engineering(ICCAE)

格致樓五樓平面圖

2016 International Conference on Civil, Architecture and Environmental Engineering(ICCAE)

room 501	room 511	room 510	room 509	room 508
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room 503				room 506
room 504	Female toilets	Male toilet		room 505

2016 International Conference on Civil,
Architecture and Environmental Engineering(ICCAE)

Room 909
conference hall

VIP room

Break&Poster Presentation

Female toilets   Male toilet

Conference Schedule

November 3, 2016

Time	Activity
15：00～21：00	Registration（Hotel）

November 4, 2016

Time	Activity
08：30～09：00	Registration（China University of Technology -Taipei）
09：00～09：40	Opening Ceremony
09：40～10：20	Keynote Speech1 **(Prof. Dr. Hamzah Abdul Rahman)**
10：20～10：40	Tea Break
10：40～11：20	Keynote Speech2 **(Prof. C. Chuang President of Vanung University)**
11：20～12：00	Keynote Speech 3 **(Distinguished Professor Wen-Pei Sung.,)**
12：00～13：30	Photography & Lunch Time
13：15～15：15	Oral Session 1～3
15：15～15：30	Tea Break
15：30～17：30	Oral Session 1～3
18：00～21：00	Welcome Banquet

November 5, 2016

Time	Activity
09：00～10：15	Oral Session 1～3
10：15～10：30	Tea Break
10：30～11：45	Oral Session 1～3
12:00	Lunch Time

November 6, 2016

Time	Activity
08：00～18：00	Academic Investigation

Keynote Speakers

Keynote Speaker 1：

	Name	Hamzah Bin Hj Abdul Rahman
	Title (Pro./Dr.)	President/Professor
	Phone Number	+603-79673202
	Email	arhamzah@um.edu.my

Department/University	President/CEO, International University of Malaya-Wales Department of quantity surveying, Faculty of built environment, University of Malaya
Research Area	Construction project, Quality management, Mitigation of construction delay, Renewable energy, Green building
Experience/Specialty	Diploma in Building of MARA, Institute of Technology B.Sc. of Central Missouri State University M.Sc. of University of Florida Ph.D of University of Manchester, Institute of Science & Tech.

Keynote Speaker 2:

	Name	Thomas C. Chuang (莊暢)
	Title (Pro./Dr.)	Distinguished Professor
	Phone Number	+886-3-4515811 ext. 20100
	Email	tomchuang@mail.vnu.edu.tw
Department/University	President of Vanung University	
Research Area	Tourism management, Strategic business planning, Bibliometric analysis	
Experience/Specialty	MBA degree from University of Delaware Ph.D. degree in Engineering from University of California Editor for Pattern Recognition Letters Work for Eastman Kodak, DuPont and Raytheon in the U.S. in the areas of electronic imaging and business development	

Keynote Speaker 3：

	Name	Wen-Pei Sung （宋文沛）
	Title (Pro./Dr.)	Distinguished Professor
	Phone Number	+886-3-5334188
	Email	sung809@ncut.edu.tw
Department/University		Department of Construction Management, Chung Hua University, Hsinchu City
Research Area		Integrated Techniques for Green Living Technologies 綠色整合科技 Digital Image Correlation Techniques 數位影像科技 Techniques of Structural Control 隔減震技術 Green Building, Green Factory and Structural Design 綠建築、綠廠房與結構設計
Experience/Specialty		特聘教授兼院長 英國工程技術學會(IET) Fellow 會士 美國水資源工程師院院士(D.WRE) 美國環境工程師與科學家院院士(BCEEM) 國際災害管理學會終身 Fellow 會士 香港國際工程技術學會(IETI) Fellow 會士 美國土木工程師學會正會員 挪威永續發展研究學會正會員 世界科學工程及技術學院正會員 中華民國註冊結構技師 低碳建築聯盟建築碳足跡評估專家 景觀系教授

Session Chairs

Prof. Yun-Wu Wu (吳韻吾)

Professor & Dean of Research and Development

Department of Architecture, China University of Technology

Research area : Architectural design、Engineering education、Construction management,、Property management、Energy technology

Contact details : 886958-317-539; davidwu31@gmail.com; davidwu@cute.edu.tw

Prof. Jimmy C. M. Kao (高志明)

Distinguished Professor

Institute of Environmental Engineering, National Sun Yat-Sen University

Research area : Groundwater and Soil Remediation、Remediation System Design and Application、Natural Bioremediation of Contaminated Sites、Wetland and Water Resource Management

Contact details : 886-7-52524413; jkao@mail.nsysu.edu.tw

Prof. Jou-Hwa Chen (陳若華)

Associate Professor

Institute of Creative Design, Chienkuo Technology University

Research area : Wind engineering, Green buildings, Structural dynamic analysis

Contact details : 886-936-324113; rhchen@ctu.edu.tw

	Prof. Hsi-Chi Yang (楊錫麒) *Department of Construction Management, Chung Hua University* ***Research area*** : Aonlinear finite element analysis, construction management, construction materials, green architecture and building information modeling ***Contact details*** : 886- 03-5186683; hcyangse@chu.edu.tw
	Prof. Chien-Te Hsieh (謝建德) *Professor/Chairman* *Department of Chemical Engineering and Materials Science, Yuan Ze University* ***Research area*** : Nanotechnology, Energy materials, Coating technology ***Contact details*** : 886-3-4638800 etx.2577; cthsieh@saturn.yzu.edu.tw
	Prof. Borliang Chen (陳博亮) *Department of Civil and Disaster Prevention Engineering, National United University* ***Research area*** : Project financial analysis and risk analysis in project management. ***Contact details*** : 886-37-382352; blchen@nuu.edu.tw ; chenborliang@gmail.com

Prof. Chiu, Yin Hao (邱英浩)

Department of Urban Development, College of City Management

Research area : Eco-city and Green building, Physical environment of urban   areas, Building science ,Environmental color, Urban studies, Wind engineering

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chiuyh0412@gmail.com

Article Section

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IC2529	T. Xi	Research on the Influence of Piloti on Residential Block's Outdoor Thermal Comfort by Questionnaire Survey and Coupled Simulation Method in Guangzhou, China
IC2532	J. Li	Research on Stress Characteristics of Concrete Carrier Pile Based on Finite Element
IC2533	Y. B. Zhang	Study on utilization of iron and steel industrial solid waste
IC2534	D.B. Fu	A method for detecting soil conditions of trenchless projects
IC2552	X. Han	Theoretical Analysis on the Deformation of Shied Tunnel Segment under Fire
IC2555	M. Halirova	Optimization of composition of the claddings of wooden structures
IC2556	J. Su	Experimental study of the drainage and consolidation character of tailings discharge-accumulated by height rising gradually under the action of drainage material
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IC2560	P. Wang	Evaluation of ultimate strength for R.C. I-shaped members subjected to combined actions
IC2563	S. Ma	Three-dimensional centrifuge and numerical modeling of pile group due to twin tunnelling in different depth
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IC2576	L. Ye	Index Selection and Weight Analysis on Underground Development of Urban Municipal Public Facilities
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IC2584	L. Chen	Risk assessment of pipeline in operation based on AHP and application of MATLAB
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IC2597	J. Lu	Optimal Water Strategy for the United States
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IC2609	X. Ou	The research on the heat transfer characteristics of the rock and soil under the effects of vertical double U type buried pipe heat exchanger
IC2611	W. Ping	Analysis and prediction of energy demand and supply in developed regions, China
IC2613	Y.M. Han	Nitrogen removal performance of ANAMMOX-PVA granules immobilized by different preparation methods
IC2616	Z. P. Guo	Pushover analysis of modularized prefabricated column-tree steel frame
IC2621	Q.X. Ye	Theory Analysis of Mechanical Properties and Mechanical design for Fabricated Zero Initial Cable Force Friction Dissipation
IC2622	X. Shan	Study on reuse of heritages of an old industrial area in Harbin Gongyijie Area against the backdrop of urban renewal
IC2624	Y.Y. Tan	The Interaction between Outflow Dynamics and Removal of NH^{4+}-N in a Vertical Flow Constructed Wetlands Treating Septage
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IC2626	Y. Wang	PPP mode's applications motivation in the field of water conservancy project----Based on the "money service" theory of Milton Friedman
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IC2781	W. Zhu	Seismic Analysis of Large Span Spatial Steel Frame with Isolation System
IC2782	Z. Ouyang	Interaction Between non-homogeneous Anisotropic Porous Seabed and Tunnel Under the Action of Wave
IC2783	R. Bai	Study On Highway Skid Resistance Evaluation With Safety Factors
IC2784	L. Jun	The effect of material ingredients on cement-based self-leveling material
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IC2881	C. Lesmana	Experimental Investigation of Connection Performance for Prefabricated Timber Beam
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IC2886	Y. Lu	Urban Catalyst and Space Heritage----Study of the design strategy for Reconstruction of the Historical District in Suzhou's Pingjiang Road in China
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IC2917	F. J. Xie	Scheme comparison for bridge reinforcement or reconstruction based on practical Effects
IC2920	Y. Li	Research and enlighten of ecological-infrastructure-oriented "Multiple planning integration " based on German's spatial order and structure planning - Illustrated by the example of Dujiangyan
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Oral Session Schedule

Oral_1：主持人：**Cheer Germ Go 郭教授其珍、Chien-Te Hsieh 謝教授建德**

論文編號 ID	演講者 Speaker	演講主題 Title	演講單位 Affiliation
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IC2799	Robby Yussac Tallar	Rebuilding the City Parks: How Far the Effectiveness of Environment-Friendly Construction?	Maranatha Christian University
IC2737	Tsung-Pin Tsai	Enhancement on Fireproof Performance of Construction Coatings Using Calcium Sulfate Whiskers Prepared from Wastewater	Chung Hua University
IC2804	Xin Tao	Ultimate capacity of uniaxially compressed perforated steel plates strengthened by CFRP	Southeast University
IC2723	Jiaxing Weng	Influence of thick and loose sediment on the vacuum load transfer	Southeast University
IC2777	Wenzheng Zhu	Experimental Study on Beam-column Joints of New Prefabricate Assembly Frame Structure	Guangzhou University
IC2882	Shi Yan	Wave propagation FEA and experimental validation of aluminum plate using piezoelectric elements	Shenyang Jianzhu University
IC2781	Wenzheng Zhu	Seismic Analysis of Large Span Spatial Steel Frame with Isolation System	Guangzhou University
IC2524	Wei He	Brief research on Arch Hinge of the Steel Truss Arch Bridge by Contact Problem under Local Stress	Southwest Jiaotong University
IC2701	Ming-Hsiu Tsai	Using Agent-based Simulation Approach for Estimating Efficiency of Building Project Design Team	Tamkang University
IC2869	Albert K.C. Mei	Exploring the Lean Strategies to Obtain the Banking Loan for the Energy Service Companies	China University of Technology

Oral_2：主持人：Jwo-Hua Chen 陳教授若華、HSI-CHI YANG 楊教授錫麒

論文編號 ID	演講者 Speaker	演講主題 Title	演講單位 Affiliation
IC2749	Olga Pattipawaej	Modelling Two Dimensional of Rubble Mound Breakwater using Dolos at Armor Layer and Geotube at Core Layer	Universitas Kristen Maranatha
IC2552	Xingbo Han	Theoretical Analysis on the Deformation of Shield Tunnel Segment under Fire	Chang'an University
IC2864	Yu-Sheng Shen	A study of low-carbon and intelligent city index system	Academia Sinica
IC2611	Ping Wang	Analysis and prediction of energy sustainability in developed regions, China	Harbin Sport University
IC2681	Di Zhao	Protection and Utilization of Gaichun Garden Ruins of the Summer Palace	Tianjin University
IC2605	Yuhua Li	Study of improved method for horizontal alignment based on line element	Dalian University
IC2657	Gang Wu	Assessment of seismic response of skewed bridges with bidirectional collision effect	Southeast University
IC2683	Jieying Yuan	Improvement of ensemble forecast of typhoon track in the Northwestern Pacific	Hohai University
IC2773	Sa Xu	Analysis on Sustainable Financial Framework and Fare Adjustment Strategy of China's Urban Public Transit	China Academy of Transportation Sciences
IC2672	Xu Liyao	Research on Participatory Renewal Design of Extensive Historical Villages in Northeast China	School of Architecture HIT
IC2870	S.W. Yeo	Physico-Chemical Properties of Kaolin-Organic Acid	University Tun Hussein Onn Malaysia

Oral_3：主持人：Borliang Chen 陳教授博亮、Chiu, Yin Hao 邱教授英浩、Su,Ying Ming 蘇教授瑛敏

論文編號 ID	演講者 Speaker	演講主題 Title	演講單位 Affiliation
IC2871	Cindrawaty Lesmana	In-Plane Lateral Load Resistance of Cast In-Situ Mortar Panels	Universitas Kristen Maranatha
IC2797	Noboru Yoshinari	Detecting Collapsed Houses from Image Datafor Estimating Amount of Disaster Debris	Hokkaido University
IC2881	Cindrawaty Lesmana	Experimental Investigation of Connection Performance for Pr Performance for efabricated Timber Beam	Universitas Kristen Maranatha
IC2589	M.T.A Chaudhary	Effect of ground conditions on design parameters for bridge foundations	Kuwait University
IC2704	Long Zhang	Research on the interfacial bond behavior between CFRP sheet and steel plate under the static load	Southeast University
IC2887	Cheng-Huang Ou	A discussion on how people perceive co-housing that facilitates generation communication	National Taipei University of Technology
IC2652	Chun-Mai Huang	A Study on Elevator Braille Graduation System of Junior High Schools in Changhua County	Feng Chia University
IC2665	C.Y. Hsia	An Accessibility Study of Elevator Braille Signage System in Da Nang City, Vietnam	Feng Chia University
IC2886	Yin Lu	Urban Catalyst and Space Heritage--Study of the design strategy for Reconstruction of the Historical District in Suzhou's Pingjiang Road in China	Southeast University
IC2676	Chenghao Wang	Study on The Transformed Strategy of "Life Field" for Aged in Coal Mine Community	Harbin Institute of Technology

Abstract

Brief research on Arch Hinge of the Steel Truss Arch Bridge by Contact Problem under Local Stress

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Because of its wide deck, elegant design and reasonable stress, the steel truss arch bridge is suit-able for urban bridges. In the steel truss arch bridge, the main arch hinge is an important structure, the local structure and the stress is complex, and it is necessary to analyze the local stress state of the arch hinge. Arch hinge problem belongs to the contact problem, this paper based on Chengdu Tianfu District Shenyang Lu Xi Duan Jin Jiang in bearing steel truss arch bridge design, take the finite element software ANSYS on the main arch arch hinge is locally analyzed, the arch at the junction of reliable performance test. Studies have shown that half through steel truss arch bridge should be adopted by reasonable cylindrical arch hinge, and Hertz theory is in the analysis of the arch hinge contact does not apply.

Research on the Influence of Piloti on Residential Block's Outdoor Thermal Comfort by Questionnaire Survey and Coupled Simulation Method in Guangzhou, China

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Piloti is commonly used to optimize the outdoor thermal environment in subtropical climate cities, and there are few studies regarding to the systematic influence of piloti on outdoor thermal comfort. As the outdoor thermal comfort differed by various climates and locations, this work firstly carried out a questionnaire survey in Guangzhou, China, to study on the local acceptance rate (TSV is lower than 1.5) during different SET* intervals. Secondly, a series of cases were simulated by coupled simulation method, which considering convection, radiation and conduction, offering high precision prediction results. At last, by adopting SET* as standard index, taking both of the questionnaire survey result and ASHRAE standard into consideration, the influence of piloti on residential block's outdoor thermal comfort was analyzed and discussed.

Research on Stress Characteristics of Concrete Carrier Pile Based on Finite Element

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It is of great significance to describe the stress characteristics of concrete carrier pile in foundation reasonably and accurately for ensuring the safety of superstructure. Based on finite element numerical simulation method, cast-in-place pile is used as contrast to analyze the change rules of Q-s curve of carrier pile by applying axial pressure and lateral pressure repeatedly, and verify the correctness of the rules through field test. The result indicates that the stress and displacement of the carrier pile are smaller than those of cast-in-place pile, stress concentration does not exist at the end of carrier pile, displacement change of the soil around the pile end is distributed symmetrically, the displacement at pile end is only 0.07cm, and there is parabola change between the load increase and subsidence values. Static load test of single carrier pile is designed in site, and stress reflection wave value of test pile is measured, Q-s curve of carrier pile is drawn, and the result is approaching to the numerical calculation result, which verifies the accuracy of numerical calculation.

Study on utilization of iron and steel industrial solid waste

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As byproducts of iron and steel industry, blast furnace slag has been widely used as supplementary cementitious material in concrete. However, the utilization rate of steel slag is still relatively low and its open-air stacking occupies a lot of land. Corrosion of reinforcement is regarded as one of the most important indexes of concrete durability. This paper reports the effect of slag admixture on the corrosion of reinforcement based on the investigation of pore liquid pH, electric flux and corrosion behavior of the reinforcement under dry-wet circulation conditions. Experimental results show that concrete with Ground Granulated Blast furnace Slag has better resistance of chloride-ion penetration but lower level of liquid phase alkalinity. The pore liquid alkalinity of concrete with Ground Steel Slag keeps at a high level, but the density of concrete is lower due to the slower growth of concrete strength in the early period. Compared to single-doped slag, Ground Iron and Steel Slag helps the concrete maintain high pore liquid alkalinity as well as good resistance of chloride-ion penetration, which would provide a better protection to fixture within concrete.

A method for detecting soil conditions of trenchless projects

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Trenchless technologies have been steadily growing in the underground projects in urban areas. It is essential to obtain soil data at trenchless zones for successfully instruction of underground projects. Thus a means for detecting soil conditions is developed in this paper by integrating horizontal directional drilling (HDD) technique and cross-hole seismic tomography. Firstly, several small-diameter holes along trenchless projects are drilled by the use of HDD technique, and Polyethylene (PE) pipes are installed along the designed path. Then, detecting instrumentations are placed in PE pipes, and travel times of each source-receiver pair are collected to reconstruct velocity distributions between the boreholes. Finally, the soil conditions and anomalous zones are determined. To verify the feasibility of proposed method, a water main pipe constructed by Pipe jacking technique is taken as an example to detect the obstacles distributions beneath bridges. The field results show that the proposed method has capable of determining soil conditions for trenchless projects.

Theoretical Analysis on the Deformation of Shied Tunnel Segment under Fire

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Shied tunnel segment would expose to elevated temperature when fire occurred in a shield tunnel. The elevated temperature will depress the segments mechanical property as well as complex the segments deformation and force analysis. This paper presents a theoretical analysis on the deformation of the segments subjected to elevated temperature. Considering the nonlinear segment section thermal degradation and mechanical property depression, a theories calculation model for the segment deformation is established. Based on the Free-From Deformation theory, the analytical solution via the model is proposed. The result shows that, when the fire listed for 2 hours, the maximum deflection reached to 79 mm at the segment crown. The upper half segment shows a significant downtrend while the lower half segment rises. The maximum horizontal de-flection occurs at 60 down from the crown, and reaches to 45 mm at 2 hours. Compared with the Chinese code for design of road tunnel, it won't be safe enough for the escape or rescuer of people after the fire listed for 40 min.

Optimization of composition of the claddings of wooden structures

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The paper shows a possible method for responsible choice of the optimal composition of the cladding of wooden structures with plasterboard or gypsum board in terms of selected criteria. The proposal unaffected by subjective opinions of solvers will be ensured by comparing of the compositions of the claddings of wooden structures.

Experimental study of the drainage and consolidation character of tailings discharge-accumulated by height rising gradually under the action of drainage material

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A tailing drainage-consolidated physical model with discharge-accumulated process by height rising gradually in which geotechnical composite drainage material is used as vertical drainage channel was established. At the same time, its drainage-consolidated process was simulated by self-developed and test de-vice which was designed based on physical model above. The results showed that: (1) rate of drainage accord with autoregressive integrated moving average model: *ARIMA*(2,1,8)×(0,0,0) on the condition of drainage-consolidated process of tailings with height rising gradually and model predicted results show that: the growth trend of maximal drainage rate becomes gradually bigger that is much less than the actual peak rate, the drain-age performance fitness has large scope for its development; (2) excreting dry upper water accumulation in time provide essential conditions for consolidation of tailings under the effect of geotechnical composite drainage material, the average stress degree of consolidation can reach 62.32%~70.81% and the average strain degree of consolidation can reach 61.27%~68.91% after the experiment of 104 days which reveals the clearly promotion of consolidation effect.

Study on Infrared Differential Thermal Nondestructive Testing Technology of the Permeability of Hot Mix Asphalt Pavements

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In order to nondestructive test the permeability coefficient of hot mix asphalt（HMA） pavements fast, A methodology for assessing the permeability coefficient was proposed by infrared differential thermal testing of pavement after rain. The relationship between permeability coefficient and air voids of HMA specimen determined. Finite element method（FEM） models were built to calculate the surface temperature difference with different exposure time after precipitation. Simulated solar radiation source and fully saturated plate specimens were set in laboratory, tests verify that the different exposure time the specimen surface temperature difference. Infrared differential thermal detection permeable pavement hardware and corresponding software developed. Based on a large number of test results, the evaluation index and criteria of permeability coefficient of HMA pavements tested by infrared differential thermal were developed. The results showed that: There is correlation between air voids and permeability coefficient of HMA specimen. Permeability coefficient of HMA pavements can be determined by different surface temperature at different exposure time. 9:00 am - 14:00 pm is the best time to detect permeability coefficient by infrared differential thermal NDT. Permeable asphalt pavement permeability can be achieved by infrared detector quickly and continuously, a lane testing; According to the permeable assessment criteria, in-place pavements permeability coefficients can be accurately evaluated.

Evaluation of ultimate strength for R.C. I-shaped members subjected to combined actions

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Under complex loads especially for earthquakes and wind loads, R.C. I-shaped members are usually subjected to load combinations of axial forces, bending moments, shear forces and torsion. This paper investigates the failure mechanism and ultimate bearing capacity model of reinforced concrete I-shaped members under combined actions. It focuses on the influence of axial force on the spatial angle of the ultimate fail-ure surface of members, on the brittle or ductile failure model, as well as on the bearing capacity of members. The revised three dimensional limit failure theory will be used to establish the failure model. The model for evaluation of ultimate strength for R.C. I-shaped members is established based on the ultimate equilibrium of twist failure surface. Finally, the model results are compared with the researchers' experimental results. The model coincides well with the experiment.

Three-dimensional centrifuge and numerical modeling of pile group due to twin tunnelling in different depth

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Tunnelling activity inevitably induces change of soil stress and hence may cause adverse effects on nearby pile foundations. In this study, a three-dimensional centrifuge model test and a series of numerical analyses were carried out to investigate the effects of pile group in clay due to twin tunnelling in different depth. The spring line of twin tunnels in the test were located at half a tunnel diameter above the pile toe (Test FF). Numerical back-analysis of centrifuge model test and parametric study were also carried out to get more insight of twin tunnels-pile interaction. Two more configurations, i.e., twin tunnels located at mid depth of the pile (Simulation MM) and below the pile toe (Simulation BB), were investigated in the numerical analyses. The relative elevation between the twin tunnels and pile group has a significant effect on the pile settlement and the pile bearing capacity. Apparent loss of the pile bearing capacity (i.e., 90.2%) and the largest pile settlement (i.e., 5.5% of pile diameter) due to twin tunnelling are identified in Simulation BB. The maximum value of the loss of the pile bearing capacity was 2.7 times of the minimum value (Simulation MM). Additionally, the maximum transverse tilting of pile group induced by twin tunnelling is also observed when C/D=3.7 (i.e., Simulation BB).

LQR Control of Across-Wind Responses of Tall Building using Composite Tuned Mass Dampers

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Composite tuned mass damper(CTMD) is a vibration control device, which consists of an active-passive tuned mass dampers supported on the main vibrating structure. The performance of CTMD for suppressing wind-induced vibration of tall building is investigated. Optimum tuning frequency and damping ratio of a single passive tuned mass damper (PTMD) for minimizing the variance response of the damped main structure under random loads derived by Krenk are used for the optimum parameters for CTMD. Optimum parameters of CTMD with different mass ratios of an active tuned mass damper(ATMD) to PTMD are 0.01,0.03,0.05 0.1,0.3, and 0.5 are chosen for the parameters of CTMD. The control force generated by the actuator of ATMD is estimated by linear quadratic regulator(LQR)controller. Fluctuating across-wind load considered as a stationary random process was simulated numerically using the across-wind load spectrum by Kareem. Comparing the controlled across-wind responses of tall building with CTMD with that of an original tall building, the reduction rate of rms responses are 15%~30%. Therefore, CTMD system is effective in mitigating excessive wind-induced vibrations of tall building.

Index Selection and Weight Analysis on Underground Development of Urban Municipal Public Facilities

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Municipal public facilities underground development is one of the most important contents of urban underground space planning. This paper studies major factors affecting the underground development of public facilities in the urban planning, including locational factor, geological environment, economy, engineering technology conditions, policies and management mechanisms and disaster prevention safety. The subjective and objective weighting method are adopted to analyze the weights of the above mentioned factors. Weight analysis lays the foundation for the establishment of evaluation model and provides scientific and reasonable evidences for establishing the "feasibility and appropriateness of underground development of municipal public facilities" evaluation system and the resolutions of underground development of municipal public facilities.

Time-dependent Reliability Analysis of Steel Fiber-Reinforced Concrete Beams Under Ten-year Load

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In order to study the time-dependent bending bearing capacity of the normal section of reinforced steel fiber reinforced concrete members under long-term load. Based on the steel fiber reinforced concrete beam flexural test results under ten-year load, considering the time varying of load effect and resistance level of steel fiber reinforced concrete beams under long-term load respectively on change the steel fiber content while the load level unchanged (group Ⅰ) and change the load level while the steel fiber content unchanged (group Ⅱ), and establish the fuction under the condition of time-dependent bending bearing capacity of the normal section of reinforced steel fiber reinforced concrete members to study the time-dependent reliability. Results show when the load is same and the fiber volume content is different, the reliability index of the steel fiber reinforced beam is significantly higher than the beams without steel fiber in group Ⅰ; When the steel fiber content is the same, the external load is different, the larger of load, the smaller of reliability index; In 100 years of service, the reliability index of steel fiber reinforced concrete beams are first increased and then decreased, the reliability index of the test piece reaches the maximum value while t = 2a and steel bars began to rust, and the reliability index was significantly decreased when t = 37.8a.

Risk assessment of pipeline in operation based on AHP and application of MATLAB

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The pipeline risk evaluation model is established based on the analysis of risk factors encountered in the operating period of pipeline and by adopting MATLAB to write the sub function programs of the model. Applying the model to the risk evaluation of a real oil pipelines in Dalian, which identifies the risk safety grade and the risk response measures of the operating period, and the calculated results is consistent with the actual. Examples show that using the risk evaluation model established by the combination of analytic hierarchy process (AHP) and MATLAB can not only draw the specific quantitative indicators to carry on the objective assessment of pipeline risks, but also the thinking is clear and the calculation is simple and efficient, which can provide reliable basis to the risk assessment and management of the operating pipeline.

Comparison of Thermal hydrolysis and wet air oxidation on sludge treatment in China

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Wet air oxidation (WAO) and thermal hydrolysis (TH) were both with high temperature and great pressure. They have been paid increasingly attention in sludge treatment in recent five years, especially TH as pretreatment of anaerobic digesting (AD) is hot in the world and in China. In experimental study of WAO, relations of saturated steam pressure and partial oxygen pressure was not clearly illustrated in sludge treatment processes. Sludge source and characteristic, energy consumption and running cost technology are important factors. Both WAO and TH can reuse energy and heat by steam recycling, heat exchanging and system designing. Typical commercial application in China of WAO and TH is illustrated. WAO has been applied to sludge treatment, which can reduce moisture to 45-48% from 80% with running cost of 150-200 RMB per ton. While TH used as independent technology to achieve 50% of water content from 80% with 120-150 RMB per ton.

Effect of ground conditions on design parameters for bridge foundations

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Ground conditions (geotechnical properties and geological setting) influences the near surface response of a strata subjected to seismic excitation. Geotechnical parameters required for computation of dynamic impedance of bridge foundations include damping ratio (β), shear wave velocity (Vs) and soil shear modulus (G). Values of these parameters are sensitive to the level of non-linear strain induced in the strata due to seismic ground motion. This paper attempted to investigate the effect of variation in soil properties like plasticity index (PI), over consolidation ratio (OCR), effective stress (σ'), depth of soil strata over bedrock (H) and impedance contrast ratio (ICR) on seismic design parameters (β, Vs and G) for two soil types (C and D in AASHTO code). It was found that variation in soil properties influenced seismic design parameters in soil type D more profoundly than soil type C.

Enhancement of aerobic granulation with real domestic wastewater by powdered activated carbon addition

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Aerobic granulation with real domestic wastewater is difficult to be achieved and usually takes a long granulation time. This study investigated the feasibility of adding powered activated carbon to enhance the granulation process. It was found that only 37 days were needed to form granular-dominant sludge in the reactor, which could be comparable with the granulation process with artificial wastewater. After 55 days operation, COD and ammonia removal efficiency were 84.63% and 93.86% respectively. Effluent nitrite accumulation was observed in the reactor indicating partial nitrification could be achieved. This study presents a novel operational strategy to cultivate aerobic granular sludge with low COD level real domestic wastewater.

Optimal Water Strategy for the United States

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Our main objective is to address the various uses of the water to an ideal weight ratio, to solve the storage and movement, to saline alkali and to protect the water during the process, covering the economic, physical and environmental benefits. The analytic hierarchy process (AHP) model is adopted to filter all the influencing factors, and to extract the final 10 criteria to determine the use of water in these 3 parts. As their weights come out, the abstract problem is successfully transferred to a mathematical model. The second step is that we refer to the grey relational model, in order to further determine the priority order of different states in the water using the weight ratio calculated on the basis of. Due to the geographical location and climate change of the States, in particular, we confirm the temperature coefficient in the following documents, in every aspect of the water demand can be in some densely populated, but the lack of water in the area. With the help of the 2 models, through which we will model and algorithm, multi-objective decision analysis model and genetic algorithm, and combined with all the water supply in each country's three regional branch of the classification, the final optimal solution is obtained.

Test study on the improved filler from blast furnace slag

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Large direct shear test and compression test for the improved filler from blast furnace slag by the large direct shear apparatus have conduced, and relevant mechanics index for fine particle cannot fill the interspace of coarse particles, so the filler has well water stability. Little occlusion cohesion of the mixture filler when the vertical stress less than 150 kPa and large occlusion more than 150 kPa. The less of vertical stress, the more of the shear shrinkage on initial stage and the less of shear dilation on later stage. When the vertical stress more than 150 kPa, the shear dilation reduce to a degree, then the shear zone formed by the fragmentation and breakage of coarse particle. Compression at the stage of loading mainly concerned with the smashed edges and corners and long flat shape particles breaking off. The settlement calculation of foundation should refer to the deformation modulus at the stage of reloading when the foundation constructed by dynamic consolidation.

Research on multi-source information fusion of tunnel geological prediction based on evidence theory

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Based on a great amount of multivariate obtained information (Geological information, geophysical prospecting data, etc.), tunnel geological comprehensive prediction is the procedure to predict the unexcavated geological situations. According to the characteristics of the current tunnel geology comprehensive prediction method, D-S evidence theory is introduced to construct the multi-source information fusion model of tunnel geological comprehensive prediction in this paper. The evidence obtained in each step is superposed layer by layer following the comprehensive prediction process that from macroscopic prediction to the geological analysis in tunnel and then comprehensive geophysical prospecting (long distance and short distance). With the evidence more sufficient, the unfavorable geological information is much more clear for predicting the unfavorable geology of tunnel barrel, which can be narrowed down to a specific location. Citing the instance of comprehensive geological prediction of the left line in the Ling Jiao tunnel, the proposed application processes and results of multi-source information fusion model of tunnel geological comprehensive prediction based on the evidence theory are introduced in detail. The prediction of four anomalies are in good agreement with the prediction of the expert groups and the actual excavation results, which shows that the proposed comprehensive prediction model can fuse various information and is capable of simulating multi-expert decision-making process without reducing the accuracy.

Study of improved method for horizontal alignment based on line element

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Based on the building-blocks method and taken line element as the foundation unit, an
improved method for horizontal alignment is presented. It can solve the problem that the building-blocks end position cannot be controlled effectively. There are four independent parameters in this method, and the rest parameters can be calculated by them. Multiple types of horizontal alignment can be displayed by using the improved method, which can increase the selectivity.

IC 2608

Environmental impact assessment of shipping construction based on FCE method

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Compared with highway, railway construction, shipping construction's concepts such as ecology, green, environmental protection are still in its infancy. Shipping construction environmental impact assessment index system is presented. By introducing analytic hierarchy process (AHP) to determine the weight, this paper uses the fuzzy comprehensive evaluation (FCE) method to carry out the comprehensive evaluation, selecting the 1st-phase of Xiangxi Autonomous Prefecture shipping construction project in Hunan province as a case study. The case results show that the impact is a negative and slight on overall environmental. The research results can support theoretical guidance for the reasonable design, green construction and environmental protection of shipping construction. It also can provide auxiliary information and scientific basis for the project environmental management and economic development planning along the route.

The research on the heat transfer characteristics of the rock and soil under the effects of vertical double U type buried pipe heat exchanger

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This research that based on a vertical double U type buried pipe heat exchanger of ground source heat pump engineering project in Nanning is through the in-situ test monitored the temperature changes in horizontal and vertical direction of buried pipe surrounding rock layer and explored geotechnical heat transfer characteristics. Our results showed that in the deepest measuring point of the monitored hole the temperature progressively drops in the unit run-time，which accumulated a drop of 5.2℃ in three years. How-ever, the temperature didn't change during the running of the unit stop. This research also revealed that the change of temperature at other measuring points has a correlation with the operation of the unit. The measuring point temperature decreased during the unit run-time whereas the measuring point temperature increased but is still lower than the initial ground temperature while the unit was out of operation. It is also found that the increasing degree of the temperature at each measuring point diminished with the increasing depth of each point. For example, the accumulation of the temperature at -5m deep, the 1# hole, amounted to 2.4℃ in 2009 when that at 15m deep amounted to 0℃. The research further showed that the temperature of each measuring point dropped year by year and that the variation degree of temperature decreased with the increase of the depth of measuring point, which suggests that ground source heat pump has cumulative effect on ground temperature.

IC2611

Analysis and prediction of energy demand and supply in developed regions, China

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Energy, which accounts for two-thirds of today's greenhouse gas emissions, is at the heart of problem and so must form the core of the solution. In this paper, the IPCC-recommended reference approach and scenario analysis were applied to Yangtze River Delta Region (YRDR) to analysis dynamic change of the energy supply and CO_2 emissions. The results showed that energy importing reliance reached 85% in 2010 and the energy structure has become more diversified in YRDR In addition, the per-capita CO_2 emission was significantly higher while carbon intensity was lower than those of the national average in China. Under the LC scenario, CO_2 emissions under the LC scenario begin to fell for the first time in 2017. Hence, if Energy-Saving and Emission-Reduction strategy and regional planning for YRDR are implemented fully, YRDR will achieve the national emission reduction targets in 2020 and will have a large CO_2 mitigation potential in the future.

Nitrogen removal performance of ANAMMOX-PVA granules immobilized by different preparation methods

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PVA (polyvinyl alcohol) was used to encapsulate ANAMMOX (ammonia oxidation bacteria) in order to decrease microbial loss in ANAMMOX and its related process for wastewater treatment. Different kinds of granules with ANAMMOX sludge immobilized in PVA gel in different mass concentration 6%, 10%, 15%，20% were prepared by cross-linking in calcium chloride solution and deep freezing method with 10% PVA solution were carried out. The results of nitrogen removal experiments showed that 10% was the best concentration for ANAMMOX sludge to be immobilized in PVA gel when better nitrogen removal performance; the granules prepared by chemical cross-linking method had better performance than the granules prepared by freezing cross-linking method for the granules prepared with the first method removed nitrite in a shorter time period (after 24 hours) while the granules prepared with the deep freezing method reacted in 7days.

Pushover analysis of modularized prefabricated column-tree steel frame

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A prefabricated steel frame with Z-shaped cantilever beam splicing is proposed, which can realize a good seismic performance through the slip of the splice. The moment-rotation relationship model of the splice is constructed through force analysis about various states of loading process of splice. A simulation method utilizing connecting element of ABAQUS to realize the constitutive relation of the splice in the overall structure is proposed. Then modal analysis and pushover analysis are conducted on the modularized prefabricated column-tree steel frame and rigid frame under the same condition, and the result shows that there is a very small difference of the natural periods of vibration of the two frames and the performance points under seismic action. The column-tree frame can dissipate seismic energy by utilizing slip of the splice, and compared with the rigid frame, the column-tree frame achieves the purpose of multiaspect seismic fortification.

Theory Analysis of Mechanical Properties and Mechanical design for Fabricated Zero Initial Cable Force Friction Dissipation

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A type of fabricated zero initial cable force friction dissipation re-centering brace (FZFDRB) is proposed. The theoretical analysis of mechanical properties and mechanical design for FZFDRB are also made. The results show that, the brace has simple structure. There is no stiffness degradation in the loading process, and the brace has full hysteretic curve and shows stable energy dissipation law. When the brace stops recentering at the residual displacement, releasing the high-strength bolts of the brass–slot steel friction plates can let the brace continue re-centering to zero point. This indicates that FZFDRB has excellent re-centering function.

Study on reuse of heritages of an old industrial area in Harbin Gongyijie Area against the backdrop of urban renewal

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The urban old industrial area, due to its geographical location and its close spatial relationship with the urban land, has become an important aspect of urban renewal. Against the backdrop of decreasing new land development in China, there is a huge demand of transforming the old industrial area. To study the transformation style of the urban old industrial area and to promote implementation of the transformation project is a major approach to enliven the urban old industrial area and increase the environmental quality of the urban material space. This paper adopts the transformation planning of the old industrial area in Harbin Gongyijie Area as an example and summarizes characteristics and problems facing the old industrial area. Combining the characteristics and specific transformation requirements of urban renewal in the Area, the author hopes that this research can provide technical support and references for planning and implementation of heritage reuse in the urban old industrial area through the functional integration of the urban space, the eco-logical environmental construction, the historical heritage protection and the space culture re-shaping.

The Interaction between Outflow Dynamics and Removal of NH4$^+$-N in a Vertical Flow Constructed Wetlands Treating Septage

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This study investigated the influence of outflow dynamics on the treatment efficiency of NH4+-N in a pilot-scale vertical flow constructed wetland (VFCW) designed for septage treatment. Continuous samplings had been carried out to measure the temporal effluent flux and the associated concentration of nitrogen compounds. The effluent shows a dependency on the sludge thickness at the wetland surface. The proposed system demonstrated a promising treatment for total nitrogen (TN), where the average removal reaches $69.21 \pm 16.75\%$. Nevertheless, it was observed that the overall removal of NH4+-N is still below 50% and the concentration of NO3--N is high in the effluent. Comparisons between the peak of effluent flux and removal rate and linear regression analysis of the outflow and NH4$^+$-N dynamics revealed that the removal of NH4$^+$-N was greatly affected by the hydraulic behavior. As the nitrification is the main process in removing NH4+-N, the percolating rate through the wetland bed determines the contact time with the attached-growth biofilm which eventually govern the treatment performance.

Optimal allocation model of residual control rights in hydraulic PPP project

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The reasonable allocation of control rights of PPP is closely related to the efficiency of PPP. In this paper, the optimal allocation model of residual control right of PPP is established from the perspective of Incentive Constraint Theory and Incomplete Contract Theory, which according to the ability difference and the goal difference between the public sector and the private sector and the uncertainty of hydraulic PPP project. The relationship between the allocation proportion of residual control rights and many factors such as the amount of investment of the private sector and public sector coordination is analyzed based on the model, and a series of incentive and constraint are put forward based on optimization allocation of residual control rights. The research results of this paper not only provide theory and application basis for the optimal allocation of the residual control rights of PPP, but also perfect and supplement the contract design theory of PPP model.

PPP mode's applications motivation in the field of water conservancy project----Based on the "money service" theory of Milton Friedman

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We study on PPP mode's applications motivation in the field of water conservancy project, on the basis of analyzing Friedman's "money service" theory, for the disadvantages of traditional investment mode in water conservancy project field. By analyzing the way of government and social capital spending money in PPP projects, we get conclusion that both of which are the way of "spending their own money to do their own thing", which fully reflects that the two sides are a win-win partnership in PPP mode. From the application motivation, PPP mode can not only compensate for the lack of local funds, improve the investment efficiency of the government, but also promote marketization and the supply-side structural reforms.

Water Use Efficiency of Lancang-Mekong River Basin Region on "the Belt and Road initiative"

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Water is an important resource factor on "the Belt and Road initiative". As the most important transboundary river in Asia, the Lancang-Mekong River plays a significant role on the development of aquatic ecosystems on "the Belt and Road initiative". For this reason, use non-radial direction distance function to analyze water use efficiency of the Lancang-Mekong River Basin region from two perspectives (total-factor and water-factor). Then discuss the influencing factors of water use efficiency in the Lancang-Mekong River by gray correlation analysis. The result shows that water use efficiency of Thailand, Cambodia, Yunnan and Qinghai are at relatively optimal level, while Vietnam, Tibet, Laos and Myanmar are relatively low. Economic development level, technological progress, industrial structure, trade and foreign investment have impact on water use efficiency. Among the influencing factors, economic development level has the greatest impact.

The Study of Evaluation Index System on Construction Enterprise′s Circular Economy

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The development of circular economy is an important way to judge quality of enterprise development and to realize the sustainable development of enterprises. This paper will combine the characteristics of the development of circular economy in construction enterprise to construct circular economy evaluation index system. Then it uses fuzzy mathematics theory and hierarchical analysis evaluation method for comprehensive evaluation of circular economy development level. Through the empirical analysis, the paper provides the reference basis for construction enterprises to further improve the level of circular economy.

Research on lateral resistant behavior and design of multi-cover plates connection for prefabricated steel plate shear wall with beam-only-connected infill plate

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The design principle for the connection of prefabricated steel plate shear wall with beam-only-connected infill plate is investigated. Expressions for determining single bolt demands for purposes of design are developed, and a multi-cover plates connection for prefabricated steel plate shear wall with beam-only-connected infill plate is designed. The lateral resistant behavior for both welded connections and multi-cover plates connections for steel plate shear wall with beam-only-connected infill plate are analyzed and compared by using ABAQUS finite element software. The effects of changes in the bolt pre-tightening force for multi-cover plates connection are investigated as well. Then, the FEM simulation results is verified by monotonic loading test of a multi-cover plates connection with 6mm infill plate, the lateral resistant behavior and the deformation of cover plates for both FEM simulation results and test results are compared. The results show that the lateral resistant capability of beam-only-connected steel plate shear wall with prefabricated multi-cover plates connection is less than the one with welded connection; in tension field, severe tearing happens on the bolt holes, and the loss of bolt pre-tightening force is large; the tearing of bolt holes and the loss of bolt pre-tightening force is getting smaller, when they are away from the tension field; the buckling of infill plate can cause deformation in cover plates; There was no significant difference on force transmission performances between welded connections and prefabricated multi-cover plates connections.

Research on sensitivity and control criteria of cable length error in double struts cable dome

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Cable dome is a kind of lightweight and efficient large-span tensegrity structure. The manufactural error of cable length will seriously affect prestress distribution of cable dome and deviate structural performance from the design goal. With a new type of double struts cable dome as calculation example, the sensitivity of cable length error to structural behavior is analyzed, under the construction method of "fixed length cable". Then, using reliability theory and nonlinear programming method, the control criteria of cable length error are obtained for this structure. And the accuracy of control criteria is verified by Monte-Carlo method. The results show that for the double strut cable dome, the length errors of ridge cables, inner diagonal cables and outer hoop cables have an obvious effect on the internal forces of other cables. The method using in this paper can get reliable control criteria of cable length error. However, the excessive allowable error in specification will lead structure unable to meet the design requirements.

The Post-evaluation of Green Residential Building in Ningxia

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Green residential building more and more people are concerned. However, the actual investment in green residential buildings has been limited to the standard requirements and lacks multi-objective performance development, at same time, the evaluation criteria system of Green residential building is not comprehensive enough.so in this paper, first of all, using SPSS software residents questionnaire surveys are figured and found that the judge of experts and residents' the green elements is inconsistent, so the owners' satisfaction includes in the post-evaluation criterial systems of green residential and deepens the post-evaluation criteria system of green residential building from five aspects such as the preliminary work of construction, construction process, economic, social benefits and owners satisfaction in Ningxia area, combined with expert interviews and other forms. Secondly, in the post-evaluation, it is difficult for many experts judgment matrix to meet the requirement of consistency, in this paper using MATLAB program judgment matrix consistency is adjusted and determines weights of the criteria and sub-criteria and experts weights using group AHP method gather the experts opinions. Finally, the grey clustering method was used to establish the post-evaluation model and the real case of Saishang project is carried out. It shows that the result obtained by using the improved criteria system and method in this paper is in a high degree of agreement with the actual result.

A Study on Elevator Braille Graduation System of Junior High School in Chang-Hua County

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This article investigates into the present situation, with regards to the lift Braille systems of 21 elevators of junior high schools in Chang-hua County as the research aims to probe into the different situations of the lift Braille system among them. Meanwhile, as a research project, non-barrier laws and regulations standard are taken into consideration, to analyze the project about the facility size and function keys of elevators, carry out present on-site investigation, and conduct comprehensive discussions; then incorporated into questionnaire and Analytic Hierarchy Process (AHP) to establish the standard and grade of barrier-free elevators in Changhua County. The results of this research accessible elevator are: 1.To be understand the Braille elevator signage systems of junior high schools in Chang-hua County. 2. To conduct analysis of the proportion of elevator sizes for the non-barrier laws and regulations standard. 3. Make comparisons of the main keyboard function key configuration, partition and floor. 4.To establish the ranking system and grading pattern (A、A+、AA、AAA) of elevators of junior high schools in Chang-hua County.

Assessment of seismic response of skewed bridges with bidirectional collision effect

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Unbounded laminated elastomeric bearings are commonly used as connected components of skewed bridges in China, this type bearings is likely to sliding during earthquake, which will lead to large highway bridges with skew angles varying from 0° to 60° are developed to discuss the effect of different collision models and design parameters on the seismic response of skewed bridges in China. The results suggest property of shear keys and abutments in this paper can capture the irregular behavior of skewed bridges correctly. The uneven collision phenomenon will be more obvious for changing the initial gap f shear keys, and the overall seismic response are likely to become complicated, an appropriate gap is recommended to reduce the seismic damage of skewed bridges.

Structural Design of a Prefabricated Steel Frame Structure with Inclined Braces

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A new modular prefabricated steel structure that is characterized by high construction efficiency, low labour intensity, convenient quality control, and consumption of excess capacity of the steel industry is used in the project. The structural design and in-depth research are performed in the paper using a finite element method. The strength, rigidity, and stability of the structure and relevant components are calculated. The results show that all indices are compliant with the standards and regulations. Through pushover analysis and finite element analysis of the joints, the mechanical characteristics of the system under the design load and the failure mode under the ultimate load are obtained, along with the elastoplastic development pattern; yield failure mode and potential mechanisms were further explored. The results also show that the structural system is consistent with the design philosophy of "strong joint, weak component". The system is basically in the elastic stage with reasonable yield mechanisms in case of major earthquakes. Therefore, both the elastic and elastoplastic performance comply with structural design requirements. This paper presents an innovative design method that suits the system and provides a technical reference for the design of similar structures.

The Exploration of Designing Ungated Community

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Gated community is a very common residential area in Chinese mainland. But it is time to think about the gated life style and the current situation of the city. The ungated community can help city to decrease the number of traffic jams, and let citizens enjoy more open landscape and more convenient public facilities. Establishing ungated community needs open roads network system, density architectural forms, friendly urban interface and open landscape.

Design for perception management System on offshore Reef Based on integrated management

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According to the analysis of actual monitoring demands, using integrated management and in-formation technology it is proposed quad monitoring system to realize offshore reef intelligent perception in the article, including building indoor environment, entity architectural structures, facilities and perimeter, which will strengthen the ability of analyze and evaluate for offshore reef operation and health information, promote decision efficiency.

An Accessibility Study of Elevator Braille System in Da Nang City, Vietnam.

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Research paper about elevator equipment in Da Nang City, Vietnam. The Braille System of barrier-free elevator equipment set up, and analysis of the differences; research project based on accessibility norms, and research purposes: First, Da Nang City Elevator Braille system analysis and explain the meaning of its contents. Second, according to the Vietnamese TCXDVN 264-202: Houses and buildings-Basic rules of accessible design and construction for people with disabilities, 64.3% of Braille panel used English Braille, and 21.4% used Korean Braille. Elevator equipment shall comply with the provisions of the concept of universal design.

Research on Participatory Renewal Design of Extensive Historical Villages in Northeast China —A case study of the conceptual planning and design of the Revolution Village in Bei'an City, Heilongjiang Province

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The research targets at the extensive historical villages which are abounded in the northeast China. Based on the perspective of people's livelihood, the research pointedly puts forward the method of participatory renewal. Also, the research takes the conceptual planning and design in Revolution Village in Bei'an City, Heilongjiang Province as an example, explains the specificity of the participatory renewal design in detail. The specificity refers to breaking down barriers between different fields, respecting for the design of the subject's intention, and pursuing the rational innovation through its characteristics.

Study on the optimized hydraulic circulation system of artificial lake

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Constructing an optimized hydraulic circulation system is an effective means to improve the lake water quality. The hydraulic circulation of the artificial lake in Shangyu was designed including the external circulation system and the internal circulation system. The flow field of the lake was simulated and analyzed based on MIKE21 software, the results showed under the same water supplement and wind condition, the internal circulation system combining with the morphological characteristics of lake could eliminate the area of dead water zone obviously.

Investigation and analysis of thermal comfort and IAQ in naturally ventilation primary school classrooms

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This research studied the variables of the thermal environment and indoor air quality (IAQ) of classrooms measured in a naturally ventilated primary school in Shenyang. This paper also demonstrated students' thermal sensation trends and IAQ satisfaction in classrooms. This study took measurements from 6 classrooms, 32 teachers, and 197 pupils during the winter term, lasting from November to December of 2015, while the heating system was used. These results indicated, Classrooms' IAQ was bad during winter time, and the CO_2 concentration exceeds the standard 1500ppm. Thermal and IAQ satisfaction of teachers and students in the classroom were different. Most of the students can not make accurate judgment of the indoor air quality. The study shows the existing ventilation mode can't meet the needs of winter in the classroom. Appropriate air purification equipment and monitoring equipment should be used in the future development.

Study on The Transformed Strategy of "Life Field" for Aged in Coal Mine Community—A Case Study of Community Renewal Design of SiHe Coal Mine in JinCheng，ShanXi

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Coal mine community is driven by the coal mine industry, and it's mainly relies on coal mining enterprises to provide benefits for residents. Under the background of increasing serious global aging problem, the problems in the field of elderly people's health, life, entertainment, communication, retirement and reemployment and other aspects become more acute and urgently to be solved. So it is necessary to make a more detailed study on how to transform the coal mine community according to the special needs of the elderly miners. This article takes renewal design of SiHe coal mine in JinCheng of ShanXi province as an example and takes the community's "life field" as a clue, trying to put forward the transformed strategy of "life field" for aged in coal mine community and to come up with a method to update the community throughout the whole atmosphere to the personal space.

Protection and Utilization of Gaichun Garden Ruins of the Summer Palace

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The Summer Palace enjoys the last and most complete large-scale royal garden in Chinese feudal society. Gaichun Garden, located in the Longevity Hill of the Summer Palace, was built in Qianlong Period, consisting of Gaichun Garden and Weixianzhai covering an area of about 20,000 m2. As a garden located in mountainous region, with gullies in front and cliff on the backside, Gaichun Garden contains pro-found artistic conception, where multi-culture converge, i.e. Confucianism, Taoism, Buddhism, reflecting the ideology unification between Emperor Qianlong and the saint, and is of profound cultural connotation and historical research value. In the 10th year reign of Emperor Xianfeng (1860), the Anglo -French Allied Force incinerated and plundered many gardens in the suburb of Beijing, Gaichun Garden was also destroyed at that time but hasn't been repaired due to the economic and political situation. The surviving gardens and buildings have suffered too many times of destroy to reflect the historical appearance. In this paper, research and analysis will be carried out on the remaining buildings, rockery and stone settings, ancient trees and visitor utilization to understand cultural relics content, analyze existing problems and safety hazards and propose relevant protection strategies, playing a positive role for the overall protection of the Summer Palace, display and value cognitive.

The optimization of ensemble forecast of typhoon path

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Based on the forecast data obtained from the China Meteorological Administration (CMA), Ja-pan Meteorological Agency (JMA), Joint Typhoon Warning Centre (JTWC) of USA and Taiwan Meteorological Centre (TMC), ensemble forecasting of 24h typhoon tracks for all the typhoons over the Northwestern Pacific in 2013 to 2015 has been conducted by using the optimized running training method. This paper has designed three cases based on the selection of path error. Some typical typhoon will be chosen to verify if the best case has general applicability. After that, I will try to find out if this new method is superior to the former. Results show that these three cases contribute to forecasting of typhoon tracks to some degrees, while case Ⅰ is superior to others. This case's prediction error compared to the best station has increased by 30.26%, and others has increased by 0.57% and 29.25% respectively; In terms of single typhoon track prediction, case Ⅰ is lower than the single station, and it shows that case Ⅰ has general applicability; Compared to the previous method, the optimized running training method has decreased forecasting error by about 30%.

Development of a Web-based hybrid BIM Cost Estimating System for Fire Safety Engineering

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In this study, a building project cost estimation system is developed using the web-based technology. Called the web-based hybrid BIM cost estimating system, it incorporates the building information management (BIM) with external cost estimation data to facilitate cost estimation in the early design stage and improve the efficiency of project implementation. The system is mainly composed of the following modules: "Basic Project Information", "BIM System", "Fire Safety Equipment Property Database", and "Web-based System Management Interface". Through its BIM components, it can provide efficient estimation and references for decision making. To verify the feasibility and benefits of the system, a case study is conducted by using the Web-based hybrid BIM cost estimating system and the traditional 2D CAD method to evaluate the same case and then compare the cost evaluation accuracy and efficiency of these two methods. According to the comparison results, the system developed in this study is better than the 2D CAD method in terms of both cost estimation accuracy and efficiency.

Seismic Response of Long-span Cable-stayed Bridge with Slip-shear Metal Damper

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The relative displacement between floors is utilized by shear metallic damper (*abbr. SMD*) to dissipate energy during earthquake and has been used widely in buildings to protect the main structure from damage under strong seismic motions. *SMD* can be driven by the relative displacements between girder and towers or piers to dissipate energy for long-span cable-stayed bridge with floating or half floating structural style. Hazardous internal force may be induced by implement *SMD* between girder and tower or piers directly, since the normal displacements requirement for temperature or vehicles are need for long-span cable-stayed bridge with floating or half floating structural style, and it may damage the superstructure of substructure of bridges. A strategy is presented in the paper to eliminate above hazardous internal force by implement a limit groove above *SMD* with initial gaps in moving direction, named as Slip-shear Metal Damper (*abbr. SSMD*). The initial gaps can satisfy the daily vary displacement requirement, and the *SMD* can dissipate energy once the displacement between girder and tower or pier exceeds the initial gaps. In this study, the implement of hysteric model for *SSMD* is presented and the research on the seismic reduction of *SSMD* for long-span cable-stayed bridge is investigated.

Development of new elastic constant estimation method using laser ultrasonic visualization testing

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This paper presents a new elastic constant estimation method using the laser ultrasonic visualization testing for anisotropic elastic solids such as CFRP (Carbon Fiber Reinforced Plastics). In this paper, first, EFIT (Elastodynamic Finite Integration Technique) formulations for general anisotropic elastodynamics are described. Next, the procedure of our developed elastic constant estimation method is described with anisotropic elastodynamic theory. As numerical examples, elastic constants of a CFRP specimen are predicted by the proposed method. In addition, simulation of ultrasonic wave propagation in the CFRP with estimated elastic constants is implemented by using the EFIT and the results are compared with those obtained by the laser ultrasonic visualization testing to validate our proposed method.

Test and parametric analysis on post-fire seismic performance of SRC column-RC beam joints

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In order to study the hysteretic behavior of SRC column-RC beam joints after fire, the fire and pseudo-static tests were carried out. Based on the experimental results, the numerical simulation was developed to research influence of parameters, such as heating time, axial compression ratio, concrete strength and steel ratio of profiled steel, on the hysteretic behavior of the joint. The results show that the bearing capacity and stiffness of joints will degrade after fire. With the increase of axial compression ratio, concrete strength and profiled steel ratio of column, the bearing capacity and stiffness the of SRC column-RC beam joints were improved.

An Investigation into the Mechanism of Feasibility Study for the Revitalizing of Idle Public Facilities through Outsourcing of Venue Management

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This study found that any proposed revitalization strategy through outsourcing of venue management must be subject to proper feasibility studies and negotiations. Public departments shall refer to the "profitability" and "economic benefits" of the public facilities to formulate various tendering criteria. Private entities, on the other hand, must determine whether these tendering criteria would be compliant to their investment expectations and "financial benefits". Under reasonable "financial benefits", feasibility studies and negotiations shall then be carried out in order to determine whether the revitalization strategy of the public facility is capable of complying with the features of the public facilities and the objectives of providing socioeconomic and public benefits.

Using Agent-based Simulation Approach for Estimating Efficiency of Building Project Design Team

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The project team collaborative efficiency simulator (PTCES) proposed by Tsai and Huang (2015) was an agent-based simulation tool helping project managers to estimate the workflow efficiency resulted from the collaborative behavior of the team members. Applying the PTCES, this study continuously extended the practice of efficiency estimation to the architectural design project team and facilitated the architectural design project efficiency evaluation. A case of four-floor nursery school building design was studied in this paper including verification, validation, sensitivity analysis, and scenario experiment steps. According to the sensitivity analysis results, the collaboration willing threshed (W) was found to be the most significant factor influencing the design process efficiency (EC) and the project design duration. Moreover, a virtual scenario to estimate the efficiency enhancement caused by adopting building-information-modelling (BIM) collaborative design system in the project design team was also simulated. The optimistic improvements of the studied case, including 30% efficiency enhancement and 22.5% duration reducing, contributed by BIM collaborative design system were estimated.

Research on the interfacial bond behavior between CFRP sheet and steel plate under the static load

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The interfacial bond behavior between CFRP and steel plate plays an important role in the strengthening effects of steel structure reinforced by CFRP. In this paper, experimental studies based on double-shear specimen were conducted under static load which considered the influence of different bond width and layer number. This paper presented the failure modes, bond strength, strains of CFRP and bond-slip relationship. Test results showed that the bond strength of the specimen could be significantly improved by the way of bonding layers of CFRP sheets or increasing bond width although the ductility was reduced because of layers of CFRP. The bond-slip curve between the interface of CFRP sheet and steel plate had an approximately bilinear shape.

Field Assessment of Window Daylighting with Prismatic Glazing

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Prismatic glazing has the potential to improve indoor illuminance levels and luminous comfort. Through field measurements and the comparison with Desktop Radiance simulation results, this study shows that using prismatic glazing at side windows can improve indoor illuminance levels and illuminance uniformity, especially for inner spaces. The technology can work effectively in both sunny and cloudy days with better performance in sunny days. Prismatic glazing systems refract light into inner spaces and thus can provide better luminous comfort environment for building occupant.

Distribution Characteristics of Ammonia Emission from Livestock Farming Industry in Hunan Province

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The distribution characteristics of livestock ammonia emissions in Hunan Province were investigated with the foreign average emission factor applied as calculating factor. The total ammonia emissions of poultry feeding industry in Hunan province are $39.84 * 10^4$ in 2014, among which the city emission maximum was in Hengyang City as much as $5.50 * 10^4$ t/a. Moreover, the ammonia emissions in 2014 from livestock in Hunan Province were in the average intensity of 1.88 t/km^{-2}, the Xiangtan City emission intensity up to 3.87 t/km^{-2} as the maximum. The results showed the reduction of ammonia emissions was mainly attributed to the gradual expansion of exit and prohibited area. Furthermore, pig breeding was founded to be the largest source of ammonia emission, as the proportion to 54.82%.

Application of aerobic bioremediation to cleanup octachlorinated dibenzofuran polluted soils

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In this study, effectiveness of using Pseudomonas mendocina NSYSU (P. mendocina NSYSU) on the bioremediation of octachlorinated dibenzofuran (OCDF)-polluted soils was evaluated through batch and bioreactor experiments under aerobic conditions. The goal of the research were to assess the feasibility of biodegradation of OCDF by indigenous soil bacteria and isolated bacterial strain (P. mendocina NSYSU) from OCDF-polluted soils, and Results show that P. mendocina NSYSU was able to degrade OCDF through the aerobic cometabolic mechanisms with the addition of carbon substrates. Up to 62% of OCDF was removed after a 50-day operation with carbon substrate supplement. Results indicate that primary substrate supplement is required for the enhancement of aerobic biodegradation of OCDF, and OCDF could not been used as the sole carbon source for the growth of P. mendocina NSYSU. Results reveal that an aerobic bioremediation system using P. mendocina NSYSU as the inocula would be a cost-effective system to remediate furan-polluted soils.

IC2716

Experimental study on water-soil interaction influence for environmental change of marine soft soil

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In this paper, the research object is marine soft soil in Linhai Park of Qinzhou Port and Qisha Park of Fangchenggang Port. The marine soft soil environment factors, additional load stress of coastal reclamation layer and calcium ions of pore water chemical composition, were simulated by using a soil soaking-load linkage. The soil soaking-load linkage is mechanism simulation device. Impact on water-soil interactions of marine soft soil was analyzed for additional load stress of coastal reclamation layer and calcium ions of pore water chemical composition. The conclusion is as follows. Firstly, from the point of geotechnical engineering, there are mainly hydraulic connection, water chemical field and additional load stress of coastal reclamation layer for the soil and water environmental change of marine soft soil in coastal reclamation district. Secondly, the soil and water environmental change of marine soft soil in coastal reclamation district is simulated by using a soil soaking-load linkage. Thirdly, under the same circumstances of the calcium ions concentration of soak solution, the consolidation deformation of artificial soil samples come up under the action of additional load stress, consequently, artificial soil samples' porosity decreases. Artificial soil samples' porosity and osmotic coefficient decreases along with the increase of additional load stress of coastal reclamation layer. Artificial soil samples' calcium ions content decreases along with the increase of additional load stress of coastal reclamation layer. Fourthly, under the same circumstances of the additional load stress of coastal reclamation layer, artificial soil samples' calcium ions content increases along with the increase of calcium ions concentration of soak solution. Fifthly, artificial soil samples' porosity and osmotic coefficient decrease slightly along with the increase of the calcium ions concentration of soak solution under the same circumstances of the additional load stress of coastal reclamation layer with the exception of 180 kPa in Linhai Park of Qinzhou Port.

Mechanical analysis of rockburst considering the "locked in" stress in the driving face of roadway

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In the driving face of rock roadway in underground engineering, local dynamic phenomena or dynamic disasters often occur, such as rockburst, pressure bump, shock bump, etc, in which the occurrence of rockburst in the driving face is more frequent. In order to study its formation mechanism, a stress inclusion was assumed to exist in front of the driving face of rock roadway based on the "locked in" stress hypothesis and the mechanical model of driving roadway was simplified under consideration of "locked in" stress. Then based on the basic theory of elastic mechanics, the stress distribution laws of the rock around a stress inclusion under the combined stress of the overlying rock and the inclusion was deduced. By analyzing the stress distribution of the surrounding rock of the inclusion, a conclusion is obtained that when there is a certain distance from the driving head to the inclusion, the surrounding rock would be destroyed along the direction of the maximum principal stress. When the excavation work is close to the inclusion, the rock between destroy weak surfaces will be thrown to the excavation space causing dynamic disasters under the combined stress of the overlying rock and the inclusion and left the crater section of "V" type. The mechanical analysis results of this paper can provide theoretical support for the prevention of rockbursts in the excavation process of underground geotechnical engineering.

Influence of thick and loose sediment on the vacuum load transfer

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Field experiments were carried out to find out the influence of thick and loose sediment on the vacuum load transfer in vacuum preloading. The results indicate that it is greatly affected by the loose sediment when vacuum load is transferred to prefabricated vertical drain (PVD) through sand layer and not influenced when through pipe system because of its good airtightness. Thus pipe system is more suitable as the horizontal transfer medium of vacuum load than sand layer in the case of overlying loose and thick soil layer. Besides, vacuum pressure in the PVD (VPPVD) decays rapidly in the loose sediment layer, especially in the unsaturated zone and the decay rate increases with the increasing of VPPVD in this layer. The settlement analysis validates the transfer rule of vacuum load indirectly. Soil compression occurs mainly in the loose sediment layer because most of vacuum energy is consumed in this layer.

Study on major safety defect identification of port engineering

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Presently there is no regulation or standard developed for identification of major safety defect in port engineering in China, and there is no common cognition on identification of major safety defect in port engineering, which vary widely. In this paper, three research methods (accident deduction, risk assessment of safety defect and expert consultation) for identification of major safety defect in port engineering are proposed that provides technical support to the development of standard for the identification of major safety defect in port engineering. By using the above three methods, the list of major safety defect in port engineering is put forward.

Investigating the Impact of Greenery on Driver's Psychology at Freeway Tunnel Portal

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The great environment difference inside and outside freeway tunnels is the major cause for a higher accident rate than other tunnel sections. To assess the psychology of drivers because of load and distract factors form the traffic environment, investigation and analysis of heart rate of drivers was used in the paper. By using the Illumination Meter and Dynamic Electrocardiograph, based on a mass of experimental data, we found the quantitative relationship between the greenery form and the drivers' heart rate changes. The results showed that: following the deepening process of greenery level, illuminance gap narrowed; greenery on the tunnel portals can effectively reduce the illumination difference inside and outside the tunnel. Drivers are mentally released because of the greening settings when traveling in a tunnel section.

Enhancement on Fireproof Performance of Construction Coatings Using Calcium Sulfate Whiskers Prepared from Wastewater

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This work is dealing with the fireproof performance of $CaSO_4$ composite painting for fire passive protection in building construction. An efficient microwave-assisted method is adopted to fabricate high-crystalline $CaSO_4$ whiskers from wastewater. The as-prepared $CaSO_4$ whiskers display one-dimensional structure with a high aspect ratio of 40. The thermal resistive behavior of $CaSO_4$-containing paints are investigated by using thermo-gravimetric analyzer, differential scanning calorimetry, and direct flaming test (at 150, 570, and 1100 C). The addition of $CaSO_4$ whiskers not only improves the anti-flammability but also reduces the ignition temperature of construction painting. This result can be attributed to the fact that the heat transfer through the $CaSO_4$-containing painting can be impeded until the endothermic reaction steps (i.e., dehydration of gypsum ($CaSO_4 \cdot 2H_2O$) and crystalline phase change of ß-hemihydrated plaster) are totally completed. The burned fractions (including pyrogenation and carbonization) on $CaSiO_3$ substrate are decreasing functions of the content of $CaSO_4$ whiskers, proving that $CaSO_4$ works as an insulator against heat transfer and flame spreading. Accordingly, the $CaSO_4$ whiskers can be considered as an effective fire retardant additive for improving the fireproof ability of construction coatings.

Energy Use and CO$_2$ Emissions in China's Pulp and Paper Industry: Supply Chain Approach

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This study is to assess GHG and energy use of China's PPI using an accounting framework that accounts for the entire supply chain. A cradle-to-grave tracking is applied into calculation. We consider three groups of raw materials--wood, waste paper, and non-wood fiber--yet focus on wood and waste paper that are further divided into two subclasses according to the sources: domestic and imported. The different impacts in the major exporting countries to China's PPI are analyzed with land use change in consideration. In addition, sensitivities to changes in major factors in the supply chain are examined. The results of this study are useful for accounting framework designing and decision making of regional strategy department of PPI.

Simulation of nonlinear ultrasonic waves in anisotropic materials using convolution quadrature time-domain boundary element method

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In recent years, a new ultrasonic nondestructive testing method that utilizes nonlinear ultrasonic behavior generated in cracks or at a bi-material interface has emerged. However, the mechanism of generating subharmonics and higher harmonics is theoretically still not well understood. In this research, to simulate higher harmonics, dynamic contact problems of a crack face with contact boundary conditions in anisotropic materials are investigated by the convolution quadrature time-domain boundary element method (CQBEM). Numerical results show that the cracks with contact boundary conditions in anisotropic materials excite higher harmonics as well as those in isotropic ones.

Modelling Two Dimensional of Rubble Mound Breakwater using Dolos at Armor Layer and Geotube at Core Layer

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Coastal protection structure is used to protect the coast against erosion that is usually determined by the availability of materials at or near the job site, the sea conditions, water depth, and the availability of equipment for the implementation of the work. The purpose of this study is to conduct experimental research in the laboratory to get the rubble-mound breakwater design optimum and tools before it is applied directly in the field to reduce the risk of failure of construction. The study is conducted for laboratory testing two dimensional rubble-mound breakwaters model with dolos at armor layer and geotube at core layer using regular wave and with three variations of slope in front of the structure facing the seaward, i.e., 1:1.5, 1:2, and 1:2.5. High water level varies for the conditions of non-over-topping, over-topping and submerged. The two dimensional rubble-mound breakwaters model with the slope in front of the structure facing the seaward 1:2.5 shows the most stable of the rubble mound breakwater model.

Study on Layout Method of Newly-Added Feeder Bus Lines Coordinating with Bus Rapid Transit

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With a rapid development of bus rapid transit (BRT) system in China, many studies on planning and design of BRT is conducted, but there's little research on the feeder system of the BRT system, especially for the layout of the newly- added feeder lines. This paper firstly puts forward that the reasonable influence area of BRT and the layout of feeder lines should be determined based on questionnaire surveys of passengers close to the BRT stations. Secondly, the selection principle of newly-added feeder lines and the feeder stops was proposed. And then a mathematical model with the connection benefits (including travel time cost and operation cost) as a minimum objective function has been conducted for the first time, and improved genetic algorithm has been designed to calculate the model, and the layout scheme of newly-added feeder lines was solved. Finally the methodology was applied to the case of Beijing BRT line 1. With the goal of 80% passengers' interest, the reasonable influence radius of Beijing BRT line 1 is 3.89 km. After the calculating the model, 8 newly-added feeder bus lines was designed linking to the Beijing BRT line 1. The results reveal that the layout method of newly-added feeder bus lines coordinating with BRT can be well used to support the feeder system design of Beijing BRT.

Research on Influence of Zeolite Powder on Internal Humidity and Autogenous Shrinkage of Self-Compacting Concrete

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The influence of zeolite powder on humidity, autogenous shrinkage and mechanical properties inside the self-compacting concrete as the self-curing material are researched. The addition amount of zeolite powder is 0%, 2%, 4% and 8% respectively, the results show that self-compacting concrete with zeolite powder as self-curing materials, can improve the slump loss. When addition is 2%, it have influence on compressive strength at early age and less influence at later age. Compared with reference Self-Compacting Concrete, when internal relative humidity decrease 100% to 90%, reference self-compacting concrete takes 4d while self-compacting concrete with 2%, 4% and 8% zeolite powder respectively takes 6d, 14d and 24d. selfcompacting concrete with zeolite powder addition is 2%, 4% and 8%, autogenous shrinkage of 2d zeolite powder self-compacting concrete respectively decrease 21.4%, 34.9% and 57.3% and 7d autogenous shrinkage respectively decrease 12.6%, 26.8% and 39.4% compared with reference self-compacting concrete.

Research on limit equilibrium circle theory of entry support

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In order to discover the effect of floor and ribs failure to the whole entry stability in the three soft coal seam, through site measurement and numerical simulation, the failure circle around the entry is obtained, and its mechanism is explored. Based on Protodyakonov's arch theory, the limit equilibrium arch function of entry roof is set up by considering the effect of floor and ribs failure. It is found that the height of roof equilibrium arch is proportional to the equivalent width of the entry, and is inversely proportional to the friction coefficient of rib and roof. When the ribs are failure, the equivalent width of entry increases, and the increment of roof equilibrium arch height is proportional to the depth of rib failure zone. When floor is failure, it cause the equivalent height of entry increases, and result in the equivalent width of entry increases and the height of roof equilibrium arch increases. The increment of roof equilibrium arch height is proportional to the floor failure depth. Thus, the theory of equilibrium circle of entry is established based, and it is pointed that strengthen the ribs and floor is important to improve the stability of the whole entry.

Evolution characteristics of rainfall erosivity area based on frequency analysis method in Zhejiang province

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Based on the daily rainfall data of 84 meteorological stations from 1980 to 2009 in Zhejiang province, the power function model was used to calculate rainfall erosivity. Frequency analysis method, Mann-Kendall test method and cumulative deviation method were used to mining data changes. And the spatial variation characteristic was analyzed by the radial basis function interpolation method. The results showed that the relationship of distribution area in different periods was R_l (low rainfall erosivity) > R_e (extreme rainfall erosivity) > R_m (medium rainfall erosivity) > R_h (high rainfall erosivity). The area mutation of the R_l and R_m were detected in early 21st Century. And in 1980s, the area of the R_h and R_e also mutated. The variation process of rainfall erosivity in the 30 years can be divided into three succession stages. In spatial distribution, central lower grade rainfall erosivity gradually spread into marginal higher grade rainfall erosivity.

The Numerical Analysis of Rainfall Erosivity Irregularity in Zhejiang Province

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In this paper, new indexes are used to evaluate the temporal and spatial variation irregularity of rainfall erosivity, including the cumulative relative deviation rate (C_r), long-term variation rate (L_r), general deviation index (I_d) and special deviation index (D_i). The results showed that, since 1980s, the change process of rainfall erosivity in Zhejiang province was decrease-increase-decrease. But the change of rainfall erosivity was more complex in the early 21th Century. The I_d and D_i obviously showed the typical low value areas and high-value areas. In the spatial difference, the I_d and D_i of the eastern coastal area of Zhejiang were significantly larger than those of other regions ($p < 0.01$).

Design of Campus View of Virtual Roaming System Based on VR

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Virtual reality is a new and advanced technology that produces a three-dimensional space by computer simulation, to provide users with visual, auditory, tactile and other sensory simulations. This paper, comprehensively using Vega Prime and Visual Studio software, constructs a virtual campus roaming system. The main research work of this paper is as follows: 1. based on early use of three-dimensional modeling of MultiGen Creator on the campus of Nanchang University, use Vega Prime and Visual Studio software to build a virtual campus roaming system. 2. Design the virtual campus roaming system database, which covers the data of various functional departments of the school, in order to facilitate the user's inquiry and understanding of the school. 3. Study the key technologies of virtual simulation technology: roaming technology and collision detection technology. The design improves the flexibility, immersion, and interaction of the system.

Shear Stress Calculation of Rubber Asphalt Overlay and Stress Absorbing Layer

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By using BISAR mechanical calculation software to calculate and analyze the rubber
asphalt compound pavement shear stress of different interlayer adhesive states and under the condition of stress-absorbing layer thickness, we get that the adhesive states of stress-absorbing layer, rubber asphalt surface layer and underlying cement pavement have a direct impact on the distribution of shear stress of asphalt overlay and stress-absorbing layer and the maximum shear stress of asphalt layer bottom will first decrease, and then increase as the increase of friction parameters. Therefore, the bottom layer should have good adhesion to prevent the premature entry of shear stress growth period.

Analysis on Sustainable Financial Framework and Fare Adjustment Strategy of China's Urban Public Transit

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This paper aims to design a feasible financial framework and fare adjustment strategy to intensify the financial sustainability of China's urban public transit service, therefore to support the policy of transit priority and the development of transit metropolises in China. The fiscal problems in China's public transit, the skyrocketing operating costs of public transit companies, unsustainable urban public financial subsidies, decreasing attraction of low fares to the passenger flow, are analyzed by the data on the operating costs, fares, subsidies and other information collected from Beijing, Shenzhen, Zhengzhou and other China's typical urban public transit companies. The relationship among transit service quality, costs, fares and government subsidies is analyzed systematically based on the demands of three major interest subjects in city public transit, namely passengers, businesses and governments. Based on the principle of "acceptable for the public, sustainable for businesses, and affordable for government finance", the paper proposes a feasible service quality-oriented and sustainable financial framework of urban public transit operation for China which clarifies the responsibilities of all the stakeholders in the framework. Finally, the paper offers specific fare adjustment strategy, in which the public transit fare adjustment coefficient is playing the role in the trigger mechanism.

Study on reinforcement of soil for suppressing fugitive dust by bio-activated cementitious material

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Microbial-induced reinforcement of soil, as a new green and environmental-friendly method, is being paid extensive attention to in that it has low cost, simple operation and rapid effects. In this research, reinforcement of soil for suppressing fugitive dust by bio-activated cementitious material was investigated. Soil cemented by bio-activated cementitious material had superior mechanical properties, such as hardness, compressive strength, microstructure, wind-erosion resistance, rainfall-erosion resistance and freeze-thaw resistance. The average hardness of sandy soil, floury soil and clay soil is 18.9 °, 25.2 ° and 26.1 °, while average compressive strength of samples is 0.43 MPa, 0.54 MPa and 0.69 MPa, respectively; meanwhile, the average calcite content of samples is 6.85 %, 6.09 %, and 5.96 %, respectively. Compared with the original sandy soil, floury soil and clay soil, the porosity decreases by 38.5 %, 33.7 % and 29.2 %. When wind speed is 12 m/s, the mass loss of sandy soil, floury soil and clay soil cemented by bio-activated cementitious material are all less than 30 $g/(m^2 \cdot h)$. After three cycles of rainfall erosion of 2.5 mm/h, the mass loss are less than 25 $g/(m^2 \cdot h)$ and the compressive strength residual ratio are more than 98.0 %. Under 25 cycles of freeze-thaw, the mass loss ratio are less than 3.0 %.

Experimental Study on Beam-column Joints of New Prefabricate Assembly Frame Structure

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The seismic performance of four new-type beam-column joints and two ordinary cast-in-site beam-column connections was compared with low-cycle loading tests. The study is mainly on the failure modes and mechanisms, hysteresis loops, ductility, and stiffness degradation of the joints. It is demonstrated that the specimens, belonging to classical bending failure, meet the seismic requirement of strong-shear and weak-bending for beam-column joints. There are no cracks on the surface of the joint region, and no relative slips along the interfaces between the cast-in-site column and composite beams for the bonds raised with concrete keys and reinforced bars. The seismic resistance performance of the new-type beam-column joints is almost equal to that of the ordinary connections. The construction measures of the prefabricate assembly frame structure can guarantee the safety and reliability of the novel joints.

IC2781

Seismic Analysis of Large Span Spatial Steel Frame with Isolation System

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GBase isolation technique was employed in the E Block of the Guangdong Science Center (GSC) to protect the huge span frame from damage under external loads, especially typhoon and earthquakes. In this application, isolating bearings are directly placed at the base of the main columns of the building. Non-linear dynamic analysis and shaking table tests were conducted to study the effect of the base isolation on vibration modification, evaluate the improvement of the seismic-resistance capability, and estimate the deflection compatibility of the isolation. A $1/35^{th}$ scale model was constructed and tested on shaking table under a series of base excitations with gradually increasing acceleration amplitudes. The results show that the experimental test setup can simulate the vibration characteristics of the prototype structure perfectly, and the stiffness simulation for isolating bearings is successful. With the comparison of the natural vibration characteristics and the dynamic responses, such as accelerations and displacements, of the structure for the cases with or without base isolation, it was demonstrated that base isolation can remarkably improve the seismic-resistance capability of the building and improve the torsion performance of structure with irregular plan. The investigation indicates that the isolation design for GSC is rational and is a useful effort for isolation design in huge civil engineering.

Interaction Between non-homogeneous Anisotropic Porous Seabed and Tunnel Under the Action of Wave

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The real characteristic of seabed has an important meaning on the study of seabed-tunnel's dynamic response under the action of wave. Based on theory of Biot's dynamic consolidation and the elastic dynamics, a two-dimensional numerical model of the seabed – tunnel due to wave is established with the finite element method. Under wave load, influences of the inertia force of seabed-tunnel, the contacting effect of tunnel-soil and the boundary effect of seabed's both two sides on the homogeneous porous seabed-tunnel are discussed first in this paper, finally, on the basis of studies mentioned above, the non-homogeneous anisotropic seabed are aimed to research the influences on the internal stress of tunnel, the pore water pressure and displacement of seabed around the tunnel under different distributive parameters. The results indicate that the permeability and anisotropy have certain influences on the pore water pressure and displacement of seabed around the tunnel, while are not sensitive to the internal stress of tunnel when other conditions of seabed soil remain constant; and the heterogeneity along depth of seabed's shear modulus has large influence on the internal stress of tunnel.

Study On Highway Skid Resistance Evaluation With Safety Factors

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Pavement skid resistance condition should be taken into account with due care when evaluating the highway maintenance qualities, because it is related to the users' life and property. However, there are arguments on the importance of fully reflected safety factors among current skid resistance evolution indicator. This study is aimed to provide information that can be used for references on the improvement of evaluation standards by laying emphasis on certain areas with recommendations.

The effect of material ingredients on cement-based self-leveling material

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The effect of water-reducing agent, fly ash and re-dispersible latex powder on the flexural strength, compressive strength and fluidity of cement-based self-leveling material were investigated. The results show that the addition of fly ash can improve the fluidity of self-leveling mortar, however excessive fly ash leads to higher water requirement. Fluidity of the system decreases when additional fly ash is added at a constant water-cement ratio, which decreases the compressive strength and flexural strength. Water reducing agent can improve the fluidity of self-leveling mortar, however the compressive strength at the age of 1 day and 7 days decreases. Addition of the re-dispersible latex powder leads to more water absorbing and in favorable fluidity.

Sanitation improvement and the bottleneck analysis of equity in China: from the perspective of specialists

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Accessible improved sanitation is critical to child health, and inequities in improved sanitation can be interpreted as health inequities across socio-economic groups. This study assesses the equity of sanitation improvement in China and finds out the bottleneck problems on equity across provinces. Based on United Nations Children's bottleneck analysis framework and practical situation, we established a scale questionnaire, which included four dimensions - policy environment, supply, demand and quality. A new equity-score model was generated to review sanitation improvement. We regarded questions with the three lowest scores as the bottleneck of sanitation improvement within province. The bottleneck problem of policy environment, demand, quality across provinces were Question 11, Question 23, Question 29 and 30. Questions on supply dimension were much better. As for the equity score, Question 6, 9,25,27,28 were the lowest scores and indicated the inequity on sanitation improvement. The bottleneck problems of equity derive from relevant propaganda campaign, training and following interventions. Economic condition was the primary factor influencing sanitation improvement. The key work should be more effectively promoting the sanitation improvement on demand dimension. Health Departments should highlight the announcement of health-related knowledge.

Detecting Collapsed Houses from Image Data for Estimating Amount of Disaster Debris

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In a massive earthquake, it becomes difficult to understand a situation in a stricken areas, because the accesses to the stricken areas are frequently lost. Especially, Tsunami leaves much debris and breaks accessible paths. In order to restore the stricken areas, it is required to estimate the amount of disaster debris as soon as possible. It can decide the number of temporary storages and arrange transportation. This study is to propose a system that detects collapsed houses by three aerial photographs after a disaster. Finally, we verify the accuracy of the proposed method, and discuss the point of the amount of estimating disaster debris.

Rebuilding the City Parks: How Far the Effectiveness of Environment-Friendly Construction?

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Recently, the ecological restoration projects at waterbodies have increased significantly and ap-plied in many areas. Many researchers have working on large-scale restoration projects with some complex variables and considerations involved but only few are focused on the small-scale project. The purposes of this study were: (1) to evaluate and monitor the ecological restoration projects at Barclay City Park, Tainan City, Taiwan R.O.C, by using Post Project Appraisals (PPAs) and compare with several city parks in Ban-dung, Indonesia; (2) to promote an ecological approach that incorporates public perceptions into city parks restoration projects in Bandung City, Indonesia to determine what environment-friendly constructions to the long-term benefit of ecosystem. The data were collected by kick samplings and then used Before-After-Control-Impact (BACI) method. We sampled and analyzed seven water quality parameters, i.e. temperature, electrical conductivity, salinity, pH, dissolved oxygen at several sections then identified the aquatic habitat within. The results showed that water quality condition was still unclear with limited ecological value. The study also identified that the degraded water quality condition has increased the public awareness. Therefore, the application of sustainable ecological projects in urban drainage systems could also improve the aesthetic value in context of urban landscape and gained growing public interest, as a result of its positive effects on water quality and quantity issues. Further, the study recommended the necessary of continuing water quality monitoring and public hearings programs. Further recommendation is the principles of ecological effective-ness, methodological and economic efficiency, and socio-cultural engagement should be interwoven in the application of the guidelines and the framework for planning and implementing ecological restoration.

The research on the Norbulingka garden art characteristics under the background of Han-Tibetan cultural blending

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Norbulinka is one of the centers of politics, religion and culture in Tibet. The perfect combination of architectural art, religious art and garden art creates the one and only Norbulinka. Garden art is the detailed embodiment of people's life. This paper through the analysis of garden art of Norbulingka explores the world outlook, philosophy of life and values of the Tibetan. At the meanwhile the research on the common features between Tibetan garden arts with traditional Hans garden art reflects the two nationalities have many similarities when they are dealing with the relationship between man and nature.

Ultimate capacity of uniaxially compressed perforated steel plates strengthened by CFRP

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The aim of the present study is to investigate the ultimate capacity of perforated plates strengthened by CFRP under uniaxial compression along its longitudinal direction. A new test rig combining with existed universal hydraulic testing machine has been designed to achieve simply supported along all edges. Some 36 plates were tested. Test results showed that if CFRP is pasted on the convex surface of initial deflection, it will improve the capacity of uniaxially compressed perforated steel plates very well; otherwise it will be almost of no effect. It also shows that the use of CFRP strengthened perforated plates have a better result in a big slenderness plate with a small hole and a medium slenderness plate with a big hole. And the use of CFRP strengthened perforated plates with a certain plate slenderness ratio (b/t), such as b/t=66, no matter how the size of the hole' diameter changes, the CFRP strengthening effect remains stable. Also it can be seen that the pasting of CFRP cannot increase the stiffness before buckling, but it can improve the mechanical property afterwards.

Application of indicator in factor analysis on transport energy consumption

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As the energy issue is getting more serious with the economy development of the world, the re-search on the issue of transport and logistics sustainability is becoming more and more popular for researchers all around. For one respect, the restriction of energy consumption in transport sector for logistics is crucially important to a certain extent. There are many ways for analyzing the factors of the superfluous energy consumption in transport to give reasonable interpretation for the incentives of it. In recent years, factor analysis relating method such as decomposition analysis and data envelopment analysis are used in literatures in order to scratch the principal factor that leads to the consumption. However, it remains a problem that why the very factors are selected for the analysis instead of others, and there is no convincing evidence given by the analyzers. In this paper, we decide to use the method of indicator analysis rather than generally used factor analysis to make the analysis afterwards more reasonable and give application of the method. Indicator analysis considers the possible factor to be candidate indicator and evaluate them in advance based on the criteria of indicator se-lection. The criteria are developed for the application in the transport domain and classified into three categories which named representation, operation and policy application.

Releasing flux and characteristic of nitrous oxide from wastewater land treatment systems

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Wastewater land treatment system can remove pollutants deeply under the combination process of physical, chemical and biological functions. During the complex process of biological metabolism, green-house gases, such as nitrous oxide (N_2O), will release from the substrate bed, causing the block of land treatment system and the destruction of atmospheric environment. This paper reviews the production mechanism of N_2O released from wastewater land treatment system. Furthermore, the influence of impact factors (types of system, plant and temperature) on N_2O release characteristic was summarized in constructed wetland sys-tem, slow rate land treatment system, rapid infiltration system, overland flow system and subsurface wastewater infiltration system. And the method of accounting N2O releasing flux was introduced. Finally, the viewpoint was pointed out that temperature, matrix composition and operation conditions affect N_2O releasing flux considerably.

Renaissance with recycled materials: the reconstruction of Guifeng temple

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The meaning of green building materials is not only the material itself, but a representation of a using policy, covering the whole life cycle of a construction. In view of this, when it achieves some success in energy saving, non-pollution and recycling of building materials, it provides new ideas for the green building materials research. In the reconstruction of Guifeng Temple in Mount Zhongnan, the designers considered the future development trend of the region, especially taking 3 factors in account of reuse of building materials, selection of the structure and installment construction, and then made plan and design systematically with local building materials. More than protecting the traditional architectural style, meanwhile it diversifies the development of the temple, leading to a preliminary mode of reconstruction which adapts to local economy and culture.

The Research on Architectural Heritage Conservation Planning in the Historical and Cultural Areas Based on GIS

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With the rapid economic development, the growth of population, and exploitation in the center of the city, architectural heritages with their material and historical environments have suffered from constructive destroy. How to carry on the heritage protection of historical and cultural areas planning in order to inhere culture needs a new urban planning concept and technical method of intervention. The "Xi'an Economic and Social Development Five-Year Plan Thirteenth", which enacted in 2016, and the "Regulations On Protection Of Historical And Cultural City Of Xi'an", which enacted in 2002, made several regulations to protect historical and cultural areas. We choose Baxian temple area as our study area .By using the ARC GIS geo-spatial analysis software and field research, we can process the survey data and establish the GIS database. With the heavy weight analyzing software YAAHP and the raster calculator in ARC GIS, we can get a comprehensive architectural value assessments and use it in conservation planning.

Research on the measurement of the permeability coefficient of porous asphalt pavement

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The drainage capacity of the porous asphalt pavement is related with the permeability of the porous asphalt concrete. On the basis of drainage mechanism of the asphalt pavement, the horizontal permeability coefficient and vertical permeability coefficient of the drainage pavement can be measured by the experimental test. The relationship between the water permeability coefficient and permeability coefficient tested by the pavement seepage meter was established in this research. Finally, the measurement method of the permeability coefficient of the drainage asphalt pavement was proposed. It is proved that the permeability coefficient of the porous asphalt pavement can be measured in a rapid way by the pavement seepage meter.

Research on safety management of construction project based on Game Theory

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The shortage of construction project safety management has been one of the problems that hinder the development of construction industry. Strengthening the construction safety management not only can promote the development of the construction industry, but also can promote the social stability. This paper uses game theory to study the relationship between the main parties of construction project from the macro perspective. Firstly, using the static game theory of mixed strategy to establish the game model between supervision units and contractors, and then using principal-agent system to establish the game model between owners and supervision units, and taking the first model into the second model to construct an extensive form between owners and supervision units and contractors, this pa-per obtains the construction project safety equilibrium point, and put forward the safety management strategy for the supervision unit and contractor. Finally, introducing the application of the model by the case.

A Study of Development Planning for Conservation Areas in Taiwan.

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The conservation of ancient monuments has special meaning in its own period. As time goes by, the area keeps the original style of the area had been. More and more conservation areas are formed step by step in the procedure of the changes and development. And they are still the units of the developing city construction. Nowadays, we are still paying much attention to the hardware in case which preceding in the conservation areas of ancient monument and conservation areas are delimited in few cases. The great majority of ancient monuments are still persevered without integrity conservation concepts.

Prestress distribution calculation method of ridge tube cable dome with annular struts

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Cable dome structure is the large-span spatial structure with high structural efficiency, which is suitable for large span roof structure. In order to compensate the weaknesses of traditional cable dome, and enrich cable dome structure schemes, a new type of cable domes, ridge tube cable dome with annular struts, was proposed by authors. Compared with traditional cable domes, the structure avoids the disadvantage of ridge cable easy relaxation, has greater whole rigidity, with good static performance, and the construction difficulty is reduced. The cable dome structural shape and the whole rigidity are mainly determined by the prestress distribution, so force finding analysis is the key to the new cable dome research. In this paper, the redundant constraint was replaced by constraint force, according to the node equilibrium relationship and considering self-weight, the prestress distribution calculation formulas of ridge tube cable dome with annular struts were deduced. The calculation method reduced the operation cost, made the horizontal force and vertical force transfer in the internal structure clear, and convenient for engineers to calculate by hand or by computer. Simulation results using ANSYS finite element iteration method verified the accuracy of the calculation formulas. Using derived calculation formulas, the prestress calculation table of ridge tube cable dome with annular struts, with self-weight and under different constraint force level, was obtained, to provide reference for engineering design and the study of mechanical properties.

Study of Hydrological Regime Recognition and Ecological Flow Threshold of Small and Medium Flood of Xiaoqing River in Ji'nan City

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It was known that hydrological regime was the main influencing factor of river ecosystem, but the hydrological regime of urban rivers was poorly understood. We collected daily discharge at the Huangtai station of Xiaoqing River from 1960 to 2014 and divided the data into three periods: good ecosystem period (1960-1985), significant effects of urbanization period (1986-2007) and ecological management period (2008-2014). Then we calculated hydrological parameters and analyze the tendency and change rates of each component in the three periods respectively by the method of Environmental Flow Components (EFCs). Combined with the ecological significance of environmental flow components and the hydrological regime of good ecosystem period, we identified the small and medium flood was the greatest impact component to the hydro-logical regime and river ecosystem. We used the hydrologic and hydraulic parameters of the good ecosystem period as control condition to calculate the ecological threshold of small and medium flood under the current situation, which was [44.5, 96.6]m^3/s. This study could provide technical support for restoring and improving hydrologic regime and ecological environment of Xiaoqing River in Ji'nan city.

Experimental study on the ice performance of concrete pavement with Emulsion Wax Curing Agent coating

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In order to improve the ice removal efficiency and the removal rate of concrete pavement which through anti-ice performance tests、The ice mechanics performance test、Pull-out tests、ice impact test and a series of ice performance tests in winter. It evaluated coagulation static surface water freezes time、changes in water retention、friction between layers of ice、inter layer adhesion stress and impact after spraying Emulsion Wax Curing Agent (EWCA) in pavement. And preliminary obtaining ice performance of concrete pavement variation when Emulsion Wax Curing Agent (EWCA) as ice removal coating of pavement. The anti-ice coating performance tests indicates that sprayed wax curing agent on the pavement improve static water contact angle of pavement、deferred freezing time and was beneficial to drain. While the ice mechanics performance test indicates that friction between layers of ice and inter layer adhesion stress reduced after sprayed Emulsion Wax Curing Agent (EWCA) on the pavement and ice was easier impact crusher. The research indicates EWCA coating is beneficial to concrete pavement mechanical ice removal and protects pavement.

Promotion of transportation on urban spatial distribution and industrial development in Beijing

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The relationship between urban transportation and urban spatial layout and industry is the eternal topic of urban development. Based on the mechanism analysis of urban transportation infrastructure construction and urban industry and spatial layout, the solution and relative suggestions of the coordinated development of urban transportation, urban industry and spatial layout are put forward. The research results are helpful to change the transportation infrastructure restricts the city industrial development and urban space layout, and realize the benign interaction of the transportation and urban industry and spatial layout in Beijing. The research result will also give the technical support for the traffic infrastructure construction in Beijing, promote the adjustment and upgrading of industrial structure to guide the Harmonious coexistence of industry between center city and new town.

The study on the control optimization and strategy of Indoor Visual Comfortable Environment System

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The primary goal of the daylighting and shading system is to reduce the consumption of light and meet occupants' visual comfort. Thinking for many related control systems, they were designed that based on different algorithms, architectural models, simulation software and evaluation systems to meet the requirement. For these considerations, there is a need to propose optimization programs and develop suitable control algorithms based on the control constraints, the control strategies and experimental models. This paper summarizes several control systems of indoor visual comfortable environment and finally gives some recommendations for the future research. The current indoor visual environment control methods and the characteristics were analyzed in this paper, and it can be found that the automatic control strategy has great space for optimization by studying on an intelligent control method as well as its simulation.

Selection for frequency control point of VAV air supply system in large underground spaces

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Ventilation is an important part of the mine and other underground spaces to ensure personal safety. Previous rough design and managements lead to larger system energy consumption. A control method was proposed in this paper, for the current status of the ventilation system in large underground spaces not having been taken seriously and its operation being uneconomical, where the main duct airflow rate is variable, while the branch pipe airflow rate is constant. Based on this, an experimental system was built in a laboratory, taken a practical engineering as the model. Through experiment, system total energy consumption, control effect and actual airflow rate of each branch under different constant pressure points in constant static pressure control mode were studied, and then compared them with designed values. Results showed that the optimal constant pressure point location of ventilation system in large underground spaces was where the static pressure equaled to average value of static pressures at front and end of the main air duct, where it can be better controlled and of more energy saving.

Selection of Interruptive Protection Methods in Rapid Transit Underground Construction

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Since the MRT construction is mainly shield tunneling and deep excavation, it is important to select proper interruptive protection method to prevent the impact of MRT construction on the existing structures and vice versa. The purpose of this research is to select the proper interruptive protection method to be used along the MRT lines to ensure the safety of existing structures and tunneling excavation. This research first determines the criteria and sub-criteria to be used in the initial assessment framework for the protection of the existing structures and tunneling excavation, and then it establishes the final assessing framework by using Delphi method. Furthermore, the Analytic Hierarchical Process is used to determine the relative weights of elements of each level in the hierarchical structure of assessment framework. Finally, the selection process is presented by using a study case in the Nan-Gang line of the Taipei Metropolitan Rapid Transit system.

Damage mechanism and dynamic analysis of tunnel lining structures under internal blast loading

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Considering the intense threats of explosion caused by gas leaks or terrorist activities in high-way tunnels, Three Dimensional (3D) Finite Element (FE) method was conducted to research the dynamic response and damage mechanism of tunnel lining structures subjected to internal blast loading. Motivated by the reality that explosion in tunnels not only damage the lining structures, but also lives and properties, the re-search based on the gas explosion in Luodai Tunnel is carried out. The coupled fluid-solid interaction was considered in this study, and the explosive-gas-lining system was modelled by using AUTODYN. The result of the numerical study shows that the part of inverted arch close to the hypocenter damages firstly under the impact load of gas explosion, then the sidewall nearby two arch springing exhibit various degrees of damage. Eventually, the entire tunnel lining was divided into pieces of concrete blocks by the longitudinal and circumferential cracks, the carrying capacity of lining structure was degenerated. Additionally, the deformation caused by direct blast impact can also increase steadily because of the continuously fluctuate of the explosion shock wave due to inertia.

A study of low-carbon and intelligent city index system

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The low-carbon and intelligent city is the city combines the technology, digital information, low-carbon, and sustainable development together. In order to evaluate the status of low-carbon and intelligent city effectively, city governments need to go through with the index system. However, most city governments lack the suitable index system of low-carbon and intelligent city. Therefore, this paper is to establish the appropriate index system of low-carbon and intelligent city by correlation analysis and factor analysis rating method, and evaluate the status of low-carbon and intelligent cities within the Taiwan domain. According to the empirical results, there are five evaluative aspects of the low-carbon and intelligent city: 1) economic and intelligent technology, 2) consumption of energy and resource, 3) health and environmental conservation, 4) local development, 5) social status. Based on the comprehensive performance of the low-carbon and intelligent city index system, Taipei City shows the best performance.

The numerical simulation on dynamic response of Tibetan traditional Stone-wood structure under earthquake action

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Based on the pre-existing test data obtained from preliminary study, the numerical modeling work for the characteristics of Tibetan traditional Stone-wood structure is performed in this paper. The mode of vibration and frequency were researched by modal analysis method. Meanwhile after simulating the dynamic response of structure under frequent earthquakes, the time history curves of displacement at different parts of structure along with peak displacements were obtained. And then weak parts and damage characteristics under frequent earthquakes have been summarized. Studies showed that the shapes of displacement curves at different parts of structure are so similar that the displacement of all components reached the peak at the same time. Finally the weakest parts of Tibetan Stone-wood structure are parapet walls with the largest peak displacement under earthquake and walls near structural opening are easier to be destroyed than other walls.

Exploring the Lean Strategies to Obtain the Banking Loan for the Energy Service Companies

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In recent years, the energy service companies (hereinafter called ESCO) emerged from concerns of the whole world on enterprises' energy saving and environmental protection issues. The success of financing from banks to ESCO would be no doubt the key factor to influence ESCO's development. In this study, we have interviewed some financing experts to realize what key factors will be evaluated when banks are facing this new business financing cases, and we tried to analyze with nonlinear quantified model, Fuzzy Dematel, to find out key principles and factors to ESCO's development when they are under limited resources, which could be their lean strategies in the future.

Physico-Chemical Properties of Kaolin-Organic Acid

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Soil with more than 20% of organic content is classified as organic soil in Malaysia. Contents of organic soil consist of different types of organic and inorganic matter. Each type of organic matter has its own characteristic and its effect on the properties of the soil is different. Hence, a good understanding on the effect of specific organic and inorganic matter on the physico-chemical characteristic of organic soils can serve as a guide for predicting the properties of organic soils. The main objective of this study is to unveil the effect of organic acid on the physico-chemical properties of soil. Artificial organic soil (kaolin mixed with organic acid) was utilized in order to minimize the geochemical variability of studied soil. The organic acid which consists of humic acid and fulvic acid was extracted from highly humificated plant–based compost. The effect of organic acid on the physico-chemical properties of soil was determined by varying the concentration of organic acid. The specific gravity, Atterberg limits, pH, bulk chemical composition and the functional group of kaolin-organic acid were determined. It was found that the plasticity index, specific gravity and pH value were decreased with lowered concentration of organic acid However, the liquid limits and plastic limits were found to be increased with the concentration decrement of organic acid. The analysis of XRF on the bulk chemical composition and analysis of FTIR spectra on the functional group of artificial organic soils with different concentration have confirmed little geochemical variability between samples.

In-Plane Lateral Load Resistance of Cast In-Situ Mortar Panels

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Cast in-situ mortar panel was a model of mortar wall that designed to obtain effectiveness of time, worker, and construction waste by using the unused sand from sand-filter as a construction material for building the wall. Although the wall panel is a non-structural element, the performance in residential buildings under wind and seismic loading is a major concern. The research aims to conduct an experiment of the mortar panels under lateral loading. Two panel specimens of mortar wall using a moving formwork were test-ed. The mortar panels demonstrated that the wall systems are advantageous in construction of residential or industrial buildings. The moving formwork was used for cast in-situ mortar panels to obtain solution of saving time and workers. The performances were acceptable which shown in the obtained results higher strength with acceptable displacement for non-structural elements. It should be pointed out that the connection be-tween the wall panels and the footing should be designed carefully to obtain an efficient load transfer mechanism in the structure. The inter-connection that attained from the moving formwork should be further studied since the presence of minimum dowel bars can significantly improve the lateral behavior by providing more ductility and higher strength. The cast in-situ mortar panels as alternative solution for non-structural construction material are recommended for the applications in the residential or industrial buildings.

The seismic responses of near-fault frame structure cluster on basin induced by the rupture of reverse fault

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In order to study the seismic responses of near-fault structure cluster due to the rupture of reverse fault, an integrated simulation method is used and two different models of earth media without basin and with basin are established. The seismic responses of near-fault structure cluster are simulated during a hypothetical Mw 6.0 earthquake. The presence of basin can increase greatly the shear forces of plane frame structures in structure cluster at the surface of the basin and earthquake risk positions of frame structures. There exists the trend of beating for the case with basin by observing snapshots of simulated displacement of structure cluster. The geological structure of basin should be considered in simulating seismic responses of near-fault structure cluster.

A study on residential area's adaptability design for the aged in China based on open building theory

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Through the analysis of serious aging problems in China, this paper aimed to explore the value of open building theory for guiding residential area's adaptability design for the aged in China. The main concepts involved in open building theory, including overall concept, hierarchy control, showing respect to individual interests and dynamic adjustment to need, were highly associated with residential area's adaptability design for the aged by the combination of theoretical research and case study. Based on that, this paper pro-posed two aspects of adaptability design techniques, including the design of residential planning and dwelling units, providing references for future rational design of residential areas for the aged in China.

Experimental Investigation of Connection Performance for Prefabricated Timber Beam

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This paper presents the investigation of connection performance for a simple supported prefabricated timber beams using Meranti hardwood (*Shorea sp.*). The good connection is crucial for the proper functioning of the timber structures. The adequate connection condition should be assured so the design capacity and performance of the system can be achieved. The property of material was tested according to ASTM D2395. The proposed design of bolted connections has been evaluated through experimental investigation and compared to the simple supported beam without connection. The results demonstrate the effectiveness of the proposed connection design although the ultimate load of the beam with connection is only half of the beam without connection. The test results obtained the purposed connection should be improved.

Wave propagation FEA and experimental validation of aluminum plate using piezoelectric elements

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The paper aims to develop a new finite element method (FEM) to analyze a coupled aluminum plate structure pasted a pair of piezoelectric ceramic(PZT) patches as transducers for structure health monitoring (SHM), and validate the efficiency of the proposed method. The finite element software ABAQUS is applied to directly carry on the coupled SHM system by using piezoelectric elements. Piezoelectric ceramic patches are used as either generating or receiving signal device. The piezoelectric elements are directly used for the PZT material. It is considerably focused that the influence law of PZT polarization direction and detection wave spectral characteristics on the detection effectiveness. The whole process of generating, propagating, and receiving of the detection signal is numerically simulated and the results are analyzed. In order to verify the efficiency of the proposed method, a model test of an aluminum plate structure under the same conditions is carried out, and the results are compared with that of finite element analysis. The results show that the proposed finite element model and the finite element detection method match well with the experimental results.

Urban Catalyst and Space Heritage----Study of the design strategy for Reconstruction of the Historical District in Suzhou's Pingjiang Road in China

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A city can be read, and its readability is rooted in its historical heritage. Today, with the rapid urbanisation process, emerging industries have become new economic growth points of the city, but historical district seem to be a "pertinacious illness" in the urban renewal. How to integrate these two seemingly contradictory aspects, while retaining the readability of the city, has become a problem troubling many Chinese architects. In response to this question, and as part of the project of historical district renovation in Suzhou Pingjiang Road, our design team seeks to put forward new strategies for reconstruction: Urban Catalyst and Space Heritage. Suzhou city was founded in 514 BC. Pingjiang Historic District is the most complete and the largest historic district in the ancient city of Suzhou to date. How to promote the integration of the city's modern image with traditional culture elements has become the most critical challenge within this plan. In the reconstruction of the historical district in Pingjiang Road, we have introduced new creative functions to stimulate its vitality and attract external economy. Meanwhile, this district will also retain the traditional spatial pattern, in order to recover residents' awareness of traditional culture, to achieve mutual interaction between economic development and historic culture inheritance, and to create a new space combining sustainable history with modern elements. This reconstruction plan not only verifies the traditional experience of space, but also meets the demands of modern society, offering a novel concept for the sustainable development of the famous historical city.

A discussion on how people perceive co-housing that facilitates generation communicate

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Diverse co-living has been a priority in the agenda of most nations in the world. This study attempts to investigate how people perceive co-housing from the perspective of generation communicate. To this end, a questionnaire survey was conducted for people living in the Taipei Metro Area. Totally, 192 valid copies of a specially designed questionnaire were collected, and the survey results indicated that the two most significant factors are the respondents' age and housing type, and that in co-housing, the public facilities most demanded by the respondents are public vegetable gardens/flower gardens, group dining space, and parking lots.

The Innovations of Ship Lock Design for Tugutang Hydropower-station in the Xiangjiang River

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According to XJMWD and HNWTDP, Tugutang Hydropower-station navigation-power hub was the last dam on the Xiangjiang River .So, it is very important for the development of Hunan inland waterways with the construction．It was not only analyzed that the general layout and engineering characteristics of its ship lock，but also summarized the innovations of the ship lock design. The innovations of lock head, construction diversion program by structural optimizations and considering the second ship lock in gen-eral layout were adopted in this Hydropower- station. It was provided a design reference for similar hub or ship lock by the above innovations.

Finite - infinite element analysis of soil dynamic response under moving load

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In recent years, the rail transit in China has been developed rapidly. But the noise and vibration caused by rail transit have serious impact on people's working and living. The propagation of vibration wave in the foundation soil is the key problem for the research of environmental vibration. In this paper, different element stiff-ness matrices and group sets are obtained by using three dimensional, one direction bidirectional, and three direction mapping infinite element methods. Dynamic responses of semi-infinite soil are calculated under different loads. The characteristics of vibration for the semi-infinite soil space under surface load are also analyzed and summarized.

Safety management strategies for public infrastructure projects

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Labor inspection services in many countries are not capable of carrying out their roles and functions. In Taiwan, the lowest bid tendering method (LBT) has been adopted by most public entities. As a result, occupational safety management for public construction projects faces challenges such as diminishing budgets, a reduction in staff, and the continued growth of the workforce, and thus it is getting increasingly difficult. This article examines management strategies for occupational safety in the construction industry. Several strategies were conducted to improve the safety performance of a public construction project in Tai-wan – the widening project of the Wugu-Yangmei section of National Freeway No.1. A questionnaire method is used to analyze different strategies in order to explore the understandability and effectiveness of each strategy. The findings identified in this article provide a direction for more effective safety management strategies and injury prevention programs.

A note on the ABAQUS concrete damaged plasticity (CDP) model

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In this work the ABAQUS concrete damaged plasticity (CDP) model is investigated both theoretically and numerically. The interrelations between this model and its two precursors, i.e., Barcelona model (Lublinear et al. 1988) and Lee & Fenves (1998) model, are clarified. In particular, they are analyzed with respect to the issue of mesh size dependence. On the one hand, as damage evolution is not accounted for in the definition of fracture energy, Barcelona model (Lublinear et al. 1988) and Lee & Fenves (1998) model cannot suppress the issue of mesh-size dependence. On the other hand, model an incorrect definition of the cracking displacement is used in the ABAQUS CDP, resulting in not only the issue of mesh size dependence, but also unit system sensitivity. Accordingly, the input data of stress and damage variable necessary for the ABAQUS CDP model can only be given in terms of the cracking strain, whereas the ones defined in terms of crack displacement should be used with great care unless this issue is removed in the future release.

Evaluation on the processing suitability of rural domestic sewage treatment-Fangshan in Beijing as the case

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Fangshan District Beijing Water Authority, Beijing, China

In order to understand the adaptability and the effect of multiple rural domestic sewage treatment techniques in rural areas, the technical suitability could be evaluated by using the entropy fuzzy matter-element model and AHP analysis method through an example of rural sewage treatment station in Fangshan District, Beijing. The result showed the highly repeatability of two evaluation methods, the sequence of processing suitability was: Constructed wetland (CW)> MBR >Solar anaerobic biological filter (SABF).

Module design of container architecture

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Container architecture, derived from freight containers, has an increasingly important position in the field of temporary buildings. With its modular and detachable structure, this newly emerging type of architecture shows great development potential. However, container architecture has been confined by the absence of corresponding codes and technical modification. In this article, a hockey rink in Huijia High School would be taken as an example, to illustrate a modification technology of container architecture, in which standard containers were displaced by redesigned modular units. Simplified models for engineering application were built through 3D3S, in order to analyze the bearing capacity under vertical loads.

Knowledge management in construction - the framework of high value density knowledge discovery with graph database

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With the high speed development of information technology, the use of big data technology has been deepened into more and more areas. The outstanding problems of applying big data in construction industry are large scale, multi dimensions, strong supervision and serious information island phenomenon. How to obtain the useful business information (high value density knowledge) efficiently during the acquisition, storage and batch processing of large volume data is an important subject. Here we report a method of combining the graph algorithm and the traditional data warehouse concept to obtain high value density knowledge. This method uses the subjective judgment of human beings and the objective data analysis of the machines together to get more accurate results.

Influence Analysis For Incremental Launching Of Steel Box Girder And Local Stability Control

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Incremental launching method is generally used for Steel box girders of long-span self-anchored suspension bridge during construction. First, mechanical characteristics of pushing process and the three bending moment equation were introduced. Secondly, combined Guihua Bridge, design parameters influence analysis for incremental launching process of steel box girder was carried out. Analysis showed that maximal displacement at the front of guide beam, bending moment at steel guide beam root and maximum tensile stress of steel box girder as well as compressive stress of steel box girder are periodical change along with the construction process. Meanwhile, elastic modulus and poisson's ratio have a little influence on stress and deformation of steel box girder during incremental launching process, length of steel guide beam and its average line weight density have an important influence on stress and deformation of steel box girder during incremental launching process. Finally, on the basis of elastic thin plate theory of small deflection, local stability analysis of steel box girders during the process of incremental launching have been carried out, Theoretical calculation showed that local stability of steel box girder does not meet the requirements before stiffening, after stiffening, the local stability fulfills the requirements basically. Considered constraint factors for plate groups and material nonlinearity and initial geometric imperfection as well as residual stress, finite element analysis showed that the stress by self-weight has a little influence on critical buckling stressed, which can be neglected; Installing diaphragm plate to improve the effect of local buckling of steel box girder is obvious. At the same time, The analysis results show that stress of local buckling for steel box girder less than the structural maximum working stress during the process, the risk of instability would be presented.

Scheme comparison for bridge reinforcement or reconstruction based on practical Effects

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It is an important part of scheme comparison for dangerous bridge reinforcement or reconstruction. Through systematic compared dangerous bridge reinforcement with its reconstruction based on the practical effect, a comprehensive evaluation method can be made. With the method, the Scheme Comparison analysis of dangerous bridges in Hengyang city is carried out. Finally, the program of dangerous bridge to be reinforced or reconstructed is obtain. This method can provide practical guidance for decisions of dangerous bridge scheme comparison.

Research and enlighten of ecological-infrastructure-oriented "Multiple planning integration " based on German's spatial order and structure planning - Illustrated by the example of Dujiangyan

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Spatial order and structure planning based on overall planning of "multiple planning integration" plays guidance role for other spatial plannings. This paper analyzes German's spatial planning system and explores highest-level spatial order planning and spatial structure planning based on spatial order planning. Dujiangyan is one of the second batch of pilot cities of "multiple planning integration" in Sichuan Province. Based on absorbing the experience of Germany's spatial order and structure planning, Dujiangyan innovatively constructs spatial base map of ecological-infrastructure-oriented "multiple planning integration" and specifies ecological-infrastructure-oriented spatial order and structure planning. The above innovation practice aims to strengthen the overall planning and coordination of the city-wide space and to provide reference experience to other practice of other cities' "multiple planning integration".

A unified theory of thermodynamically consistent microplane elastoplastic, damage and elastoplastic damage models

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Microplane theory is a class of general approach to establish the three-dimensional constitutive relation of materials from the simpler one- or two- dimensional behavior on the generic planes with predefined spatial orientations. Though successfully implemented, verified and applied to almost all kinds of materials, the theoretical aspects of microplane theory is still an open issue and further investigations are necessary. Within the frame work of irreversible thermodynamics we proposed a unified microplane theory in this work. The general formulation, including evolution laws of the involved internal variables derived from the principle of maximum dissipation, were presented in details. As illustrative examples, the microplane elastoplastic, damage and combined elastoplastic damage models were derived as the special cases of the proposed unified theory. The predicted results under cyclic uniaxial compression and biaxial compression show that the proposed theory is capable of describing the nonlinear behavior of concrete under dominant compression. This paper is the first step of the research work aiming to develop a thermodynamically consistent microplane model for concrete.

Homogeneous generalized yield function and limit analysis of structures with rectangular section

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A problem for the elastic modulus adjustment procedure (EMAP) is that the limit load solution varies with the initial load when the generalized yield function (GYF) is employed. To overcome this problem, we use a homogeneous generalized yield function (HGYF)-based elastic modulus reduction method (EMRM) for structures with rectangular section. The procedure for selecting fitting points from the yield sur-face was determined by the original generalized yield function and is presented here for the formulation of the relevant HGYF. The HGYF for rectangular section is presented based on regression analysis. The element bearing ratio (EBR), the reference EBR and the uniformity of EBR for rectangular section are defined on the basis of the HGYF, the strategy of elastic modulus adjustment is proposed for the evaluation of the lower bound limit load based on deformation energy conservation principle. Numerical examples show that the pro-posed method can provide a promising result for limit analysis of the structures with rectangular section.

會議特約晚宴地點
Accommodation and Location of Banquet

11 月 5 日下午 18:00
COSMOS HOTEL
天成飯店 (台北市中正區忠孝西路一段 43 號，捷運台北車站 M3 號出口，電話：02-23617856)
Homepage: http://www.cosmos-hotel.com.tw/en/accomodation/superior-single/

新北市一日遊
New Taipei City One Day Trip

團體名稱 Group：ICCAE 2016

台北市 Taipei

台北市飯店出發 -野柳地質公園 -九份老街 -黃金博物館園區

【野柳地質公園】野柳地質公園入口到海岬的末端，長約 1.7 公里，期間最寬的地方不及 300 公尺。自基金公路野柳站到海岬的末端，長約 2.4 公里。野柳地質公園的奇岩是世界奇觀之一。由於海岸延伸的方向與地層及構造線方向近於垂直，外加波浪侵蝕、岩石風化、及海陸相對運動、地殼運動等地質作用的影響，因而產生罕見的地形、地質景觀。

【Yehliu Geopark】The total distance measured from the entrance of the Yehliu Geopark to the end of the cape is about 1.7 km; the widest area in between is shorter than 300 m. The distance measured from Yehliu Stop at Jijin Highway to the end of the cape is about 2.4km. The rock landscape of Yehliu Geopark is one of most famous wonders in the world. The costal line is stretching in a direction vertical to the layer and the structure line; besides, the influences caused by wave attack, rock weathering, earth movement and crustal movement all contribute to the formation of such a rare and stunning geological landscape.

【九份老街】九份曾經是台灣北部的金礦中心，擁有高山屏障與遼闊海景的九份，除了有首屈一指的山海風光，隨著金價上漲締造了「亞洲金都」繁華絢麗的輝煌盛況，當時由海上遙望九份聚落，燈火燦爛，時人稱之為「小上海」、「小香港」。臺灣光復之後，金礦因前期的開採殆盡，產量大幅下滑，終在缺乏開採價值與經營不善之下而結束，採金事業也因此走入歷史滄桑中。隨著電影「悲情城市」一片在威尼斯影展中造成轟動之後，這個沒落數十載的小城，又三度勾起了人們的注視與回憶。現在九份有許多很有特色茶坊，這些觀海茶坊是您到九份不可錯過的地方。

【Jiufen】 used to be the center of gold mining. It is located within the hills in northeast of Taiwan. The village is next to the mountain and facing the sea. The village once was gold city of Asia and called little Shanghai or little Hong Kong. However, with the decline of gold mining activities, Jiufen fades. Later, the movies "A City of Sadness" has won first prize in Venice Film Festival and awakened people's memory of Jiufen. Now, there are many unique teahouses in Jiufen. These teahouses are best stops during visit to this mountain village. Also, there is the beautiful ocean view of Keelung outer sea.

【黃金博物館園區】黃金博物園區位於金瓜石，擁有豐富的文化和歷史遺產，也是對台灣人很珍貴的地方。該園區結合過去金瓜石人每天的生活以及黃金博物園區的發展演變，展示給觀眾歷史和生態的重要性。

【Gold Ecological Park】is located at Jinguashi. It does not only has a rich cultural and historical heritage, but also plays a significant role ecologically, which makes this place worthy of being treasured by Taiwanese. The park combines the day-to-day life of the people of Jinguashih into the development of the Gold Ecological Park, to demonstrate to visitors their historical and ecological importance.

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