

城市道桥与防洪

主管：中华人民共和国住房和城乡建设部

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——《城市道桥与防洪》

● 本期看点

我国城市地下道路研究现状及发展刍议
城市桥梁垮塌的最新案例分析及对策研究
分流制排水系统中水力模型对运行方案的优化
双壁钢围堰双顶起落架法入水定位技术

中央大道海河隧道



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Urban Roads, Bridges & Flood Control

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ROADS & COMMUNICATION

Analysis on Selection Case of Hub Interchange Qi Xuan (1)

Abstract: With the continuous development of economy in China, the construction of urban expressways and interchanges are still growing, and there are more and more various large-sized hub interchanges. The design of hub interchange is always the difficulty in the design of road interchange, and the Ring Tangent Hub Interchange located at the ring line and radiation line is to increase the design difficulties. Beikao Interchange is at the southeast corner of Foshan Ring Line I. The Ring I, Horizontal VI and Vertical V present the tangent relationship of the ring roads. The grades and the functional orientation of its intersected roads is determined that it must have the function of large-sized hub interchange. The article analyzes the combination of the main line layout and ramp layout with the surrounding terrain features, and introduces the vertical design and the node processing of local intersected roads, and at same time sums up various problems, experience and lessons met in the selection and design of Beikao Interchange, and puts forward the proposal of the relative problems for attention in the design of the similar interchanges.

Keywords: Ring Tangent Hub Interchange, Ring Line I, Beikao Interchange, selection and design of type

Elementary Discussion on Study Status and Development of Urban Underground Road in China Zhao Hui (5)

Abstract: The paper reviews three development stages of urban underground roads in China, and sums up the status and studies the characteristics from three aspects of study motivation, study contents and standard criterion. From the point of effectively guiding the traffic safety operation of underground road, the paper further studies the planning, traffic volume, traffic composition, operation speed, alignment design, entrance and exit, construction method, safe operation security system, smoke and air environmental control, escape rescue and etc. of underground roads in order to make clearly the study focus of the following key technologies and improve the operation safety of urban underground road.

Keywords: urban underground road, planning, safety design, construction method, safe operation

Management Strategy for Recurrent Traffic Congestion of Urban Expressway Integrated with ETC System

..... Yan Yongfei, Che Libin, Jiang Le, Zhou Jun, He Dan (9)

Abstract: The article analyzes the characteristics of recurrent expressway congestion, and presents the

expressway ETC ramp control and ramp access OD flow analysis model based on ETC (Electronic Toll Collection) system function and ramp control principle. According to the determination and analysis of the key ramp accesses and the different causes of recurrent congestion, the article proposes the corresponding congestion management strategies, which can be referenced for the recurrent congestion management and ramp control of the similar expressways.

Keywords: ETC, recurrent congestion, ramp control key ramp, expressway

Elementary Discussion on Design and Application of Traffic Guidance System in Urban Underground Road

..... Yang Simin (13)

Abstract: How to improve the operation efficiency of urban underground road and to make it better serve the urban traffic, and according to the summarization of underground traffic link design in the central area of Olympic Green, the article puts forward the study concept of traffic guidance system for urban underground road, and taking the underground traffic link in the central area of Olympic Green as an example, sets forth the practical application of traffic guidance system in the underground road. Through the study on the linkup scheme of the areal road network, underground road and surrounding road, the reasonable traffic organization scheme is determined. Based on it and combined with the traffic markings and traffic signs, the traffic guidance design is carried out.

Keywords: traffic guidance system, urban underground road, design, application

Elementary Discussion on Reconstruction of Urban Road Intersection

..... Mai Jiao (17)

Abstract: The urban road intersection is the bottle neck of city traffic, is the node of traffic network, is the constraint factor of road traffic capacity, and is more the key to determine the traffic smoothness. Taking Dashanzi Intersection as the study object, according to the analysis of the present situation and the surrounding lands of this intersection, and combining with the analysis of traffic flow, the article puts forward some preliminary ideas of the reconstruction design scheme. Under the present conditions and some investment, the article puts forward some feasible and effective reconstruction measures, which are significant to finally improve the driving efficiency, remit the congestion and reduce the traffic accidents of the intersection.

Keywords: urban road, intersection, reconstruction

3D Analysis on Influence of Vehicle Load on Seawall-top Pavement and Diaphragm Wall

..... Wang Bin (20)

Abstract: In the transportation of draught fan and equipment during the construction of wind power station, the heavy transportation vehicles driving at the top of seawall maybe produce a certain influence on the seawall-top pavement structure and diaphragm wall structure. Taking a wind power station project as an example, the 3D finite element analysis is carried out for the pavement structure and diaphragm wall structure under the action of no vehicle load. The calculation result shows that overlaid asphalt concrete pavement can guarantee the pavement structural strength and is favorable for the stress control of diaphragm wall.

Keywords: 3D finite element, seawall-top pavement, vehicle load, diaphragm wall, stress control

Study on Traffic Flow Operation Law of Jiain Expressway Shi Lei (25)

Abstract: Taking Jiain Expressway of Shanghai as an example, the article analyzes the operation law of traffic flow in expressway from the angles of space-time distribution, traffic composition and vehicle speed distribution, and puts forward the proposals for the routine operation and maintenance of expressway from the angle of traffic flow.

Keywords: expressway, traffic flow, operation law, space-time distribution, traffic composition

Study on Application of Traffic Impact Assessment Method for Construction Project in Changzhou City

..... Yu Jingwei, Li Bingjie, Fu Rui, Zhang Ying (29)

Abstract: The traffic impact assessment can remit the impact of traffic congestion on the city development, and promote the harmonious development of urban traffic and land utilization. Based on the practical situation of Changzhou, the article introduces the definition and objective of traffic impact assessment, determines the flow of traffic impact assessment, and carries out the traffic impact assessment for a case of construction projects in Changzhou.

Keywords: Changzhou, traffic impact assessment, land development, assessment flow

Elementary Discussion on Design of Urban Expressway Han Lei (33)

Abstract: Taking the master design scheme of the partial road sections in Jingmi Road (G101) and Huaifeng Road (Jingjia Highway) as the cases, the article analyzes the issues required to consider in the design of the expressway scheme within the built city areas in order to seek the reasonable road network, the high traffic capacity, and the coordination with the present traffic and surrounding environment, and achieve the target of driving safety, rapidness, economy, comfort and low public hazard in the design stage of road, which can be referenced for the similar projects.

Keywords: expressway, urban express way, urban area

Selection and Comparison of Expressway Lines in Shanxi Yuan Yingshuang (39)

Abstract: In the rich coal reserves of Shanxi, the layout of expressway line will often meet the coal mine goaf area, coal bed gas well, pipeline, water source area and ecological protection area. Therefore, the designers are required to comprehensively consider various control factors. Aiming at the characteristics of the natural condition in this area, the requirement of ecological environmental protection area for the local residents is fully considered and the line scheme is reasonably determined. Taking Gaoqin Expressway of Shanxi as an example, the many schemes of the line are selected and compared. The reasonable line scheme is finally determined, which can be referenced for the selection and comparison of line schemes in the similar areas.

Keywords: Gaoqin Expressway, goaf area, scenery spot, line, comparison and selection of scheme

Study of Key Technologies for Planning and Design of Coastal Roads in Tourism City

..... Shi Jiawei, Li Hong, Chen Hongpo (44)

Abstract: The perfected road traffic infrastructure is the prerequisite condition further to develop the tourism cities. The article introduces the different characteristics of traffic composition and traffic travel of coastal road in tourism city because of its special natural geographic environment. The article sets forth how to formulate the planning suitable for the coastal roads in tourism city within the limited space of road traffic in the coastal tourism city, and uses which kind of design method, and proposes the operation strategy of coastal road.

Keywords: coastal road, planning design, tourism

Design of Yongjiu Expressway North Extension Interchange Jin Xuefeng (49)

Abstract: Based on the planning and combined with the present terrain, the article introduces the design of interchange scheme of the overall alignment of urban expressway. According to the forecast data of traffic flow in the early days, the main traffic flow direction is determined. Combined with the surrounding environment, the interchange type is selected and determined. The implementation proposal of long-term and short-term combination is put forward by the development order, which can be referenced for the design of the similar projects.

Keywords: urban expressway, master design, interchange

Study of Yiqiao Road Interchange Scheme in Yichang City Sun Xu, Wang Jun, Liu Xinmin (53)

Abstract: The urban interchanges have the characteristics of limited land, complex traffic flow and many limiting factors. Based on Yichang Yiqiao Road Interchange Project, the article systematically sets forth the scheme study of urban hub interchange from the selection and optimization of construction condition, functional orientation and interchange scheme, and simulates the optimized recommended scheme by the traffic simulation method. The result shows that the traffic applicability of this interchange scheme is excellent.

Keywords: express way, urban interchange, hub interchange, control factor, scheme design, Yichang

Design of Municipal Roads in Longting Scenic Spot of Kaifeng Wang Ke (57)

Abstract: The urban roads within the scenic spot bear the complex functions of focusing on the special traffic demand of scenic spot besides satisfying the basic functions of road. The article completely introduces the design technical standard, the pavement structure design, the plane design, the longitudinal and crossing section designs of the roads in Longting Scenic Spot, and introduces the road accessible design, greening landscape design and lighting design in detail.

Keywords: road in scenic spot, design, landscape

Study on Design of Road Engineering in Sunken Bridge Area Based on Rainwater Management Ma Li(60)

Abstract: The article introduces the design data of the sunken interchanges all with the forced drainage

within Ring Road IV of Beijing from the proportion of sunken interchange, the relative road network functions of sunken interchange, and the selection, plane layout, longitudinal section and cross section of interchange, qualitatively analyzes the influence of design index on the rainwater management, and puts forward the influence factors and the countermeasures additionally considered for the design of sunken interchange based on rainwater management.

Keywords: sunken interchange, interchange design, rainwater management, interchange characteristic

Discussion on Master Scheme Design of Yingong Road in Guian New Area Hu Zhangli (63)

Abstract: Based on master planning, the article fully considers the function and orientation of this project in road network, and combined with the control factors along the line, compares the cross section and some important nodes of road, and gets the more reasonable feasible design scheme.

Keywords: scheme design, plane, longitudinal section, cross section, intersection

Brief Introduction of Chaohu City Phoenix Mountain Road Phase II Project

..... Li Fubao, Xu Haibo, Chen Taisheng (66)

Abstract: Combined with the practical projects, the article analyzes the problems possibly appeared in the design of roads, and introduces the solving methods. The proposal is the combination of the short-term and the long-term designs, and the combination of the design and the operation. The relative experience can be referenced for the similar projects.

Keywords: road, design, difficulty, road plane, vertical section

BRIDGES & STRUCTURES

Case Analysis and Countermeasure Study of Urban Bridge Collapse Mu Xiangchun (68)

Abstract: This paper sums up and analyzes the cause of bridge collapse and its study trends at home and abroad in recent years, specially analyzes eight cases of urban bridge collapses at home and abroad in the 21st century, and puts forward the relative countermeasures.

Keywords: urban bridge, collapse case, cause analysis, countermeasure study

Discussion on Planning of City Bridge Yang Shijin (73)

Abstract: Based on the characteristics of city bridge, and according to the urban bridge planning objectives, this paper proposes the design concept and principle of bridge planning, and methods of forming the city bridge planning.

Keywords: city bridge, bridge planning, design concept, bridge landscape orientation, bridge series

Analysis on Accident Mechanization and Study on Reinforcement Measures of Single Column Pier Ramp Bridge

..... Li Pan, Han Peng, Ma Yulong, Chen Chuanjing (78)

Abstract: The single column pier ramp bridge is a type of curved beam bridge. Due to the overload of vehicle, there are many collapse accidents. The article analyzes the accident damage characteristics, and gives two kinds of damage forms, i.e. overturning instability and bearing failure. Aiming at these two kinds of damage forms, the article puts forward the corresponding solving method, and makes clearly two reinforcement measures. Taking a single column pier ramp bridge of the national highway as the background, the article introduces the space finite element analysis, and calculates the anti-overturning safety coefficient and bearing reaction under the different conditions, and the anti-overturning safety coefficient and bearing reaction distribution state after reinforced. The results of validation and analysis show that the reinforcement measures of steel bent cap are the unequivocal stress, and the simple and fast construction, which can be used for the fast reinforcement of single column pier ramp bridge.

Keywords: single column pier ramp bridge, overload, overturning instability, bearing failure, reinforcement, safety coefficient

Design of Multi-span Pre-stressed Solid Slab Bridge Wang Xin (82)

Abstract: Taihe Bridge is newly built in Yizhuang of Beijing. The structure thickness of bridge crossing the river is limited within 80 cm because of the external conditions there. This structure of bridge is special. Based on it, the multi-span cast-in-situ pre-stressed steel reinforced concrete solid slab structure is selected. The Midas finite element software is used to carry out the modeling calculation of the main beam, and additionally to calculate and analyze the deflection, resisting shear and resisting punching, which can be referenced for the similar designs.

Keywords: pre-stressing, solid slab, special structure, Midas, design of bridge beam

Elementary Discussion on Design of Pre-stressed Concrete Wide Bridge Wang Ziyu (86)

Abstract: According to the National the Eleventh Five-Year Development Plan, the new airport of Kunming is determined as the relocation project, is orientated as the “large gateway hub airport facing the South Asia and the Southeast Asia, and linking up with the Eurasian, and is the core of airport layout and aviation network of Yunnan Province. The main bridge of the departure floor is the important component of the front bridge project of the terminal building of Kunming International Airport. Its characteristic is the wider bridge. The beam height is controlled by the transverse calculation. Combined with the engineering cases, the article sums up the relative experience in the design, briefly introduces the design method of wide bridge, and sets forth the general concept of structural calculation, which can provide the experience and reliable reference for the design of the similar projects.

Keywords: wide bridge, transverse distribution coefficient, calculation of plane bar system, grillage method space meter

Study on Setup Position of Temporary Pier for Midspan of Continuous Steel Truss Bridge Jiang Yang (92)

Abstract: The continuous steel truss bridge is constructed by the cantilever assembly of midspan truss segment. The article studies the relationship of setting up the temporary pier of midspan and the stress

performance of structure. The study shows that the setup of the temporary pier for midspan can obviously decrease the vertical deflection of structure under the maximum cantilever state. With the temporary pier moving to the midspan, the vertical deflection of structure, the bearing reaction of temporary pier and the scale of its lower base are gradually decreased, but the axial force of the chord member in the middle span is gradually increased. The influence of temporary pier position is little on this axial force.

Keywords: steel truss bridge, temporary pier, cantilever assembly, structure stiffness

Application of Single-pylon Single-plane Low-pylon Cable-stayed Bridge Zhang Yuming (95)

Abstract: The low-pylon cable-stayed bridge is a new bridge structure appeared in the end of 80s. The article firstly reviews the development history of low-pylon cable-stayed bridge, then briefly introduces the bridge structure and stress characteristics of low-pylon cable-stayed bridge, and also combined with the practical application of a low-pylon cable-stayed bridge (2 × 55m), sets forth the design concept of this bridge, and introduces the design gist of this bridge. The relative experience can be referenced for the similar projects.

Keywords: low-pylon cable-stayed bridge, structural design, mechanical analysis

Analysis and Discussion on Structural Seismic Resistance of Building and Bridge Unified Elevated Station

..... Li Wenbin, Li Hong (98)

Abstract: The article completely analyzes and introduces how to use the bridge design software and the building design software to carry out the structural seismic analysis of the building and bridge unified elevated station of the urban rail traffic. Combined with an elevated station of Ningbo, the article analyzes and discusses its structural calculation model and result, and puts forward the problems for attention in the seismic design.

Keywords: urban rail traffic, building and bridge unified, elevated station, seismic analysis

Application of Response Spectrum Method in Anti-seismic Calculation of Small-box Beam Substructure

..... Liu Luping, Zhou Zhishi (101)

Abstract: Taking the anti-seismic design standard of present stage as the basis and based on the practical data of a bridge in Zhongshan City of Guangdong Province, the substructure of an assembled small-box beam bridge is seismically calculated by the response spectrum method. The software of Midas Civil is established to analyze and check the bridge seismic response under the earthquake actions of E1 and E2, which can be referenced for the anti-seismic engineering of the other similar cities.

Keywords: small-box beam, substructure, anti-seismic analysis, response spectrum, urban seismic resistance

Research on Wind Resistance Performance of Qilong Highway Bridge in Foshan Lin Jiqiao (104)

Abstract: Taking Qilong Highway Bridge in Foshan as the research object, the wind resistance performance of the combined girder single-pylon cable-stayed bridge is analyzed. The basic wind speed, design reference

wind speed and critical flutter wind speed are determined based on relative specifications. By using numerical analysis methods, the dynamic characteristics of the bridge at completion state and the maximum cantilever construction state are investigated. Considering the results of wind tunnel segment model tests, the vortex induced vibration, the aerodynamic stabilization and the 3D aerostatic stability are analyzed. The results show that the new section outline design of Qilong Highway Bridge has a favorable wind resistance performance and satisfies the relative specifications.

Keywords: cable-stayed bridge, wind resistance performance, numerical calculation, model tests

Analysis and Practice of Collision Emergency of Steel Urban Bridge Cai Xiantang (107)

Abstract: The vehicle collision is a high probability event for the urban bridges, which will not only cause the great threat to the bridge, but also even possibly impact the traffic safety under bridge. At present, the collision simulation and anti-collision design of bridge are more completely studied at home and abroad. But the technical handling of great collision accident is rarely reported. Combined with a collision accident of an urban steel-box beam pedestrian overpass, the article introduces several aspects in the emergent handling measures of accidents, simulation analysis of structural damage and design of permanent restoration in more detailed in order to be referenced for the emergency design of steel urban bridge.

Keywords: steel bridge, collision damage, emergency, reinforcement

Risk Assessment of Ship Collision in Hejiang Changjiang River Bridge II Tian Bo (111)

Abstract: The article compares various representative models of ship collision risk assessment. The ship collision risk assessment method of *Code for Design of Highway Bridge in USA (AASHTO)* is used to assess the risk of ship - pier collision in Hejiang Changjiang River Bridge II. Based on the assessment result, the risk decision is made and the effective anti-collision construction measures are proposed to take in order to reduce or avoid the possibility of collision risk.

Keywords: Hejiang Changjiang River Bridge II, ship collision, risk assessment, risk decision making

Design of Deck Pavement of Jiefang Bridge in Tengzhou City Qi Yongli, Xu Zhiqin, Zhao Faxiang (114)

Abstract: Taking the deck pavement of Jiefang Bridge in Tengzhou City as the study object, the article puts forward the design requirements, paving structure and implementation gist of deck pavement. The relative experience can be referenced for the similar bridges.

Keywords: steel deck pavement, technical requirement, implementation gist

Brief Analysis on Design and Construction of Submersible Bridge Zhang Yu(117)

Abstract: The article briefly analyzes and sets forth the design and construction of submersible bridge in the aspects of its reasonable wiring, basic dimension selection, scour calculation, foundation embedment depth, detailed design and submersible embankment. The relative experience can be referred by the specialized persons.

Keywords: submersible bridge, submersible embankment, engineering construction

FLOOD CONTROL & DRAINAGE

Optimization of Operation Scheme in Separated Drainage System by Hydraulic Model

..... Gao Lei, Zhu Yi, Pan Wei, Huang Jianping, Wang Hui, Zhang Liuli (119)

Abstract: To get a better flood control effect of drainage system, the article scientifically assesses the control scheme of flood prevention and safety state of the drainage system in Changqiao Area of the separated sewer system in the central area of Shanghai by using the hydraulic model of drainage system. According to the analysis of the waterlogging area, waterlogging depth and water withdrawal time of this area during the design rainfall once in a year, once in two years and once in three years, and combined with the relative factors of rainfall process intensity and pumping station operation, the article puts forward the optimization scheme of the drainage system in this area, and simulates and analyzes the flood prevention effect after the optimization and control.

Keywords: hydraulic model, drainage system, waterlogging simulation, optimization

Study on Automatic Monitoring System of Water Quality and Water Flow Discharged from Drainage Pumping Stations along Bank of Suzhou River

..... Yu Kaihua (123)

Abstract: There are many combined sewage drainage pumping stations in the central area of Shanghai, especially along the bank of Suzhou River. The short-time water quality status is still looking blue under the condition of rainwater discharged into river at the beginning of flood season. There is no effective monitor and control. Therefore, the article sets forth the proposed study of water quality and water flow monitor system implemented for the drainage pumping stations along the bank of Suzhou River. The study work includes the master design scheme, construction contents and system function of monitoring system. The construction of this system will realize the real-time monitor of water quality and water flow discharged from the drainage pumping stations along the bank of Suzhou River, which provides the basis for the following engineering measures and the optimization of pumping station operation, and provides the basic data and technical support for the construction of the “intelligent Suzhou River” in Shanghai.

Keywords: combined sewage drainage pumping station, real-time monitor, initial rainwater, water quality and water flow

Study on Drainage Design of Urban Elevated Bridge

..... Li Zhenyu, Sun Mingyan (126)

Abstract: In order to ease the increasing traffic pressure, this kind of elevated bridge is more and more used in the urban traffic system. Due to the bridge in the open state for a long time, it is to guarantee the safety and traffic capacity of vehicle on bridge, and also must ensure the rapid drainage and smooth traffic of pavement after raining. The article introduces the significance, task and mode of the drainage of the elevated bridges. The article puts forward more feasible and effective improvement measures for the design of drain outlet

arrangement and drainage line of elevated bridges in the coastal areas of the Southern China.

Keywords: elevated bridge, pavement drainage, rainwater flow, drain outlet

Practical Application of Planting and Breeding Combination in Construction of High-level Farmland Water Conservancy Facilities Zhang Zhenrong, Zhou Yiwei (128)

Abstract: The article introduces the design concept of planting and breeding combined ecological agriculture mode and manure water returning system. Taking Shanghai Farm of Guangming Foodstuff Group as a case, the article introduces the practical application of planting and breeding combination in the construction of high-level farmland water conservancy facilities.

Keywords: planting and breeding combination, manure water returning system, pipe irrigation, interval layout of outlet

MANAGEMENT & CONSTRUCTION

Orientation Technology of Submerging Steel Double-wall Cofferdam by Double-jack Undercarriage Method Wu Hongmin (131)

Abstract: The steel cofferdam is submerged to construct by the double-jack undercarriage method. The undercarriage method is to take the steel pipe pile as the support, the structural steel as the bearing beam, the finishing rolling rebar as the suspender, and the jack as the power to constitute the undercarriage. The application of steel pipe pile and steel casing for orientation can accurately lower the steel cofferdam into water. Its accuracy is high and construction is safe and reliable. It is not required to use large-sized equipment and ships. The total station and level gauge are used to track and monitor for the correction of error in time.

Keywords: steel double-wall cofferdam, double-jack undercarriage, orientation

Proposal for Synchronous Jacking of Assembled Bridge and Design of Similar Bridges Ru Yi, Yang Lipo (134)

Abstract: Taking the synchronous jacking and bearing replacement project of a widened and assembled hollow plate beam bridge by the old and new bridges as an example, the article calculates its jacking support reaction by the grillage model, and discusses the arrangement of jacks and temporary supports in the synchronous jacking project of assembled beam bridge. The article points out that the bearing replacement should be considered during operation when the substructure and bearing of the newly built bridge are arranged and designed, and puts forward the relative design proposals.

Keywords: synchronous jacking, grillage method, jack, bearings arrangement

Hot Mixed Epoxy Asphalt Concrete Pavement Technology for Steel Bridge Deck of Tiexin Bridge in Nanjing City Zhou Jinxia (137)

Abstract: Combined with the steel deck pavement project of Tiexin Bridge in Nanjing City, the article

systematically studies the hot mixed epoxy asphalt concrete pavement structure type, hot mixed epoxy asphalt performance, mixture mixing proportion design, pavement performance evaluation and construction technology. The article completely compares the difference of pavement construction technologies between hot mixed and warm mixed epoxy asphalts. The study result shows that the hot mixed epoxy asphalt concrete has the high intensity and excellent high temperature stability, and the convenient workability, which is very suitable for the pavement engineering of long-span steel bridge. The study contents provide the reference and support for the material performance study, pavement structural design and engineering application of hot mixed epoxy asphalt.

Keywords: hot mixed epoxy asphalt, steel deck pavement, performance assessment, construction technology

Construction Control of Cross Slope and Camber of Prefabricated T-beam Wing Plate Xu Zhongkui (141)

Abstract: The cross slope of prefabricated T-beam wing plate is badly super poor and the camber is too large, which will directly influence the T-beam erection and the bridge deck pavement construction. The article sets forth that the use of correct construction scheme and construction control means can make the cross slope and camber of beam plate be at the controllable state, and ensure the integral quality of bridge beam from the control mode selection and design of wing plate cross slope, and the control design and construction control of camber.

Keywords: prefabricated T beam, cross slope of wing plate, camber, adjustable formwork, adjustable bottom die, process control

Discussion on Control Gist to Improve Qualified Rate of Submerging Steel Reinforced Concrete Sheet Pile

..... Wei Zhantong, Jiang Caixia (144)

Abstract: The article introduces the construction control gist of steel reinforced concrete sheet pile in the typical high-pile base slab revetment structure of inland waterway, and analyzes the quality impact factors of steel sheet pile during its submergence, which is propitious to improve the qualified rate of submerging the steel reinforced concrete sheet pile.

Keywords: inland waterway, on board wall, steel reinforced concrete sheet pile, control of submerging pile, Shanghai

Study on Infrastructure Engineering Project Management of College and University under New Situation

..... Yang Fan, Su Yong, Zhao Xu (150)

Abstract: In recent years, the rapid development of college and university puts forward the higher requirements for the management level of infrastructure project. The problems of low efficiency, poor comprehensive management ability and high construction cost exist in the present management of infrastructure engineering project in the college and university. Based on the advanced management theory and combined with the experience of infrastructure engineering project in college and university, the article analyzes the key links of prophase management, bidding and tendering and contract management of the infrastructure project, and puts forward the relevant improvement measures. Taking the management of infrastructure project in college and university as an

example, the article comprehensively assesses the management theory. The result shows that the project function is more improved than the traditional one, the whole life cost is reduced, and the risk of the owner is reduced.

Keywords: college and university, infrastructure, engineering construction, management

STUDY ON SCIENCE & TECHNOLOGY

Analysis on Stiffness of Inner Support for Pre-stressed Assembled Fish-bellied Beam

..... Liu Faqian, Lu Yongcheng (154)

Abstract: The construction operation side of the inner support system of pre-stressed assembled fish-bellied beam is large and its speed is fast because of its open layout mode. At the same time, the construction waste of this support is a few by reason of its cyclic utilization. This kind of support has the great development potentiality. However, there are many aspects to be further studied. Combined with the Nanjing Ring Road Tunnel Project, the article specially analyzes the stiffness of the inner support for the pre-stressed assembled fish-bellied beam, and gives the reasonable proposed value. The relative experience shows that the stiffness to support every linear meter can be 40~50 MN/m without the applied pre-stressing force. The study shows that it can be satisfied when the foundation pit is not large. The stiffness linearity of support reduces, but the bearing capacity is not changed when the span of foundation pit is larger. In order to increase the stiffness of support, it must be to increase the quantity of structural steel, but the economy is poor. The article puts forward to use and consider the pre-stressing influence of “apparent stiffness”, which can better balance the stiffness and intensity of support. The engineering practice shows that it has good effect and can be used in the design of the ring road tunnel of Nanjing.

Keywords: foundation pit, fish-bellied beam, building envelope, stiffness

Influence of Porosity on Dynamic Respond of Saturated Porous Two-dimensional Girder Lu Yongfei (157)

Abstract: Based on the theoretical model of saturated porous medium, the article considers the compressibility of solid particle and fluid, and the viscosity of pore fluid, analyzes the influence of porosity on the dynamic respond of saturated porous two-dimensional girder, and focuses analysis on the influence of porosity on the solid framework stress and fluid pressure of saturated porous two-dimensional girder, and the physical quantities of solid phase displacement and fluid displacement.

Keywords: saturated porous medium, two-dimensional girder, porosity

Analysis on Hydrological Parameters Sensitivity in Urban Rainwater Pipe Network Model

..... Wang Yinyin, Tao Tao, Lv Yongpeng (159)

Abstract: To quantitatively analyze of the sensitivity of the total runoff volume and peak flow from the stormwater management model (SWMM) of an area in Shanghai to the change respond of input hydrological parameter, the modified Morris sensitivity analysis method is used to analyze the local sensitivity of the total

runoff volume and peak flow in SWMM model to the hydrological parameters of impervious depression storage water (Destore–Imperv), pervious depression storage water (Destore–perv), impervious roughness coefficient (Manning–Imperv) pervious roughness coefficient (Manning–perv) and etc. in three times of rainfalls. The simulation result shows that the sensitivity of peak flow to the respond of the parameters Manning–Imperv and Destore–Imperv goes up with the variation of total rainfall volume, and the more increasing is peak rainfall strength, the higher is sensitivity of the total runoff volume to the respond of the parameters Max. Infiltration Rate, Decay Constant and Min. Infiltration Rate.

Keywords: SWMM, modified Morris screening method, sensitivity, calibration of hydrological parameter

Experimental Study on Treatment of Paint Wastewater by Microelectrolysis of Iron–carbon Process

..... Yang Xin, Wu Fuping (163)

Abstract: Paint wastewater is treated by microelectrolysis of iron–carbon process. The article studies the effects of iron–carbon ratio, solid to liquid ratio and pH value on the removal of COD in the static experiment, and introduces the water quality change in a running cycle in the dynamic experiment. The results show that the removal efficiency of COD is the maximum when iron–carbon ratio is 2:1, which is 43.71% in the static experiment. The higher solid–liquid ratio is, the higher removal efficiency of COD is, the lower pH is, and the higher removal efficiency of COD is. The removal efficiency of COD is the maximum and can be 57.14% when pH is 1 and HRT is 2h. In the dynamic experiment, the removal efficiency of COD can be 63.3%, and the NH_4^+ –N removal rate is lower in the first 60min. With increasing of residence time, NH_4^+ –N removal efficiency became better and better by the microelectrolysis. Its removal efficiency is 33.5% within 120 min.

Keywords: paint wastewater, microelectrolysis of iron–carbon, removal efficiency of COD

Numerical Simulation Analysis of Temperature Stress in Pump Gate Engineering Construction Period

..... Guo Gaogui, Xu Pu (166)

Abstract: Compared with the dam project, the concrete volume of water gate and pump is relatively smaller. But its structure is complex and its volume change of structural unit is large. Therefore, the cracking problem of concrete is common during its construction, and it has not been well solved now. Aiming at this problem, the article sets forth the stress variation law and cracking mechanization of concrete in the construction period of water gate and pumping station with the help of the concrete temperature and stress simulation calculation theory and method by relying on a pump gate project in Shanghai. Its contents can be referred for the design of pumping stations.

Keywords: water gate, pumping station, concrete for hydraulic structure, construction period, cracking problem, temperature stress, numerical simulation program, Shanghai

Study on Deformation Mechanism and Law of Surface Settlement of Metro Tunnel

..... Hu Lin (169)

Abstract: There are common engineering accidents of surface settlement, stratum movement and etc. in the excavation of metro tunnel because of the complex geological conditions, deep buried tunnel, long span, and

crowded pipelines in earthing. Taking a metro tunnel as the engineering case, based on the theoretical analysis and with the help of the peck surface settlement theory, the article studies and analyzes the settlement law in the excavation of metro tunnel, and introduces the function relation expression. With the help of Midas GTS numerical simulation software, the areal tunnel of the test section is selected, and the surface settlement law is analyzed and calculated in the excavation of the tunnel. Its deformation settlement curve is compared with the peck settlement theory in order to achieve the surface settlement law in the excavation of areal tunnel in Jinan Area, which can guide the engineering practices.

Keywords: metro tunnel, surface settlement, settlement tank, peck surface settlement theory, Midas GTS numerical simulation

Analysis on Aging Performance of SBS Modified Asphalt Based on Dynamic Frequency Scan

..... Zhang Lidong, Fan Liangping (172)

Abstract: In order to study the aging characteristics of SBS modified asphalt, the dynamic frequency scanning test is used to frequently scan the modified asphalts with SBS contents of 0%, 3% and 6% respectively in the different aging degrees under the conditions of many temperatures. According to the analysis of the main curve, the glassy state of transformation temperature is introduced to assess the performance features of modified asphalt and matrix asphalt before and after aging, and the CA model is used to fit the main curve. The study shows that the addition of modifying agent improves the high and low temperature features of matrix asphalt, and also slows down the aging velocity. The aging makes the low-temperature anti-cracking performance of asphalt sharply decreased, but the high-temperature performance can a certain increase. The glassy state of transformation temperature and CA model are all more applicable for assessing the performance of asphalt binder.

Keywords: road engineering, modified asphalt, aging, dynamic frequency scanning

Effect of Thickness of Bituminous Membranes on Performance of Asphalt Mixture Xu Yinhang (176)

Abstract: This paper analyzes and studies the calculation method of the bituminous membranes thickness of traditional asphalt mixture, and proposes a new formula to calculate the thickness of the bituminous membranes, and verifies it, and analyzes the effects of the different thicknesses of the bituminous membranes on the performance of mixtures. Combining with high temperature performance, low temperature performance, water stability and fatigue property, this paper recommends the thickness of the bituminous membranes.

Keywords: asphalt mixture, thickness of bituminous membranes, performance

APPLICATION OF ACHIEVEMENTS

Application and Expectation of Radar Data in Real Time Hydraulic Model of Urban Waterlogging

..... Zhu Yi, Pan Wei, Gao Lei, Zhang Liuli (181)

Abstract: This paper introduces the successful application experience of the foreign radar data in the real time

hydraulic model of urban waterlogging, compares the applications status, data features and application results of the different radars, points out that the application of radar data into the real time model of urban waterlogging is the inevitable development tendency to forecast the urban waterlogging and flood prevention in the future. And combined with the practical status in the large cities of China, the article puts forward some proposals for the continuous research and development of this technology in China.

Keywords: radar, C-Band, X-Band, flood prevention, urban waterlogging, real time hydraulic model

THE RELATIVE SPECIALITIES

Analysis on Development of Microstructure Simulation Model Study of Cement Based Materials

..... Wu Lihua, Su Qin, Fan Ke (185)

Abstract: In order to realize the microcosmic simulation of hydrated cement based materials. The article sets forth the study status of microstructure simulation model in the hardening of cement based materials in recent years. The article comprehensively compares the characteristics, advantages and disadvantages of the continuous system models of Navi, DuCOM, HYMOSTRUC, and the digital image system model of CEMHYD3D. Limited on the difficulty in the comprehensiveness of each model in the simulation of hydration process, and based on the study objective and conditions, the reasonable model is selected in order to provide the guidance for forecasting the material performance in the engineering practice.

Keywords: cement based material, microstructure, model study, comparison

Discussion on Service Mode of Third-part Measurement for Large-sized Project Chu Pingjin (188)

Abstract: According to the third-part measurement carried out in the recent years, the article introduces the demands, service contents and requirements of the third-part measurement in the engineering construction of China, and discusses the important role of the third-part measurement for the large-sized engineering construction. The relative experience can be referenced for the similar projects.

Keywords: three-part measurement, measurement consultant, service mode

Study on Application of Ground Penetrating Radar Method in Survey of Underground Cavity ... Ding Zhaowei (191)

Abstract: The ground penetrating radar is to use the electrical difference interface of electrical conductivities and dielectric constants among the mediums to detect the underground objectives for the reflection of high-frequency electromagnetic wave (frequency of tens of MHz to hundreds of MHz). The detection of underground cavity is always difficult in the engineering field. How to carry out the high-effective, large-area and non-damaged exploration is the problem many units always make great efforts to solve. With the development of electronic technique, the ground penetrating radar as a wide application range and high stability of instrument is gradually paid attention. Its expansion of application field is also the orientation the units introducing this kind of instrument make great efforts. Aiming at the high water level area of medium

field, a more reliable cavity survey technology able to widely and generally survey can be studied and will play the positive role to improve the core competitiveness and extend the market shares.

Keywords: ground penetrating radar, underground cavity, high water level of medium field

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封面工程

本期封面工程为,天津滨海新区中央大道海河沉管隧道项目,由天津市市政工程设计研究院设计。

该工程位于天津滨海新区,中央大道海河隧道路线全长4 132 m,其中隧道部分全长3 323 m(含暗埋段2 988 m及沉管段255 m)。穿越海河段采用沉管法施工工艺,由三节预制管段组成,管段长85 m、85 m、80 m+5 m。沉管管段断面采用双向6车道断面,全宽36.60 m,沉管段截面高度为9.65 m。隧道沉管段和两侧连接段为两孔三管廊结构,其中两孔为车行道范围,三管廊为综合管廊,用于放置过境的电力、热力、给水、通讯等综合管线。该工程设计分别获得天津市“海河杯”优秀设计市政类一等奖和中国勘察设计协会颁发的全国优秀工程勘察设计行业奖市政类一等奖。

结合工程实际,开展了一系列课题研究,包括抗震研究、基础处理研究、干坞稳定性与施工研究、岸壁保护结构稳定性与施工研究、曲线管段预制施工研究、曲线管段浮运沉放研究和超深超宽深基坑设计与施工研究等。课题研究成果达到国际领先水平,并获得天津市科技进步一等奖。

新型道路预养护技术

——PRC-2000沥青路面超级抗滑封层



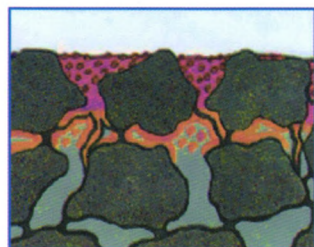
卓越性能

防水：防水下渗，在多次结冻解冻后仍有防水作用，有利于或大大减少沥青路面水损害，改善道路使用性能，延长道路使用寿命。

抗老化：可保护沥青表面，免受太阳紫外线和红外线的辐射。封层形成后会使得沥青停止氧化和老化，同时封层中的复原成份可渗入沥青混凝土30mm深处，形成共聚物，能还原已老化的沥青从而延长道路的使用寿命。

超级抗滑：特殊配方材料具有超强的粘结力，可以把原有路面和耐磨骨料紧紧地粘在一起而具有超强的抗滑能力。

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