

城市道桥与防洪

主管：中华人民共和国住房和城乡建设部
主办：上海市政工程设计研究总院(集团)有限公司



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——《城市道桥与防洪》

● 本期看点

- 济南市主城区路网跨胶济铁路通道研究
- 东五河新安大桥总体设计
- 城市道路路面雨水收集与利用系统设计
- 多点激励下地震动输入模式探讨及有限元软件实现方法研究



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..... Zhao Ning, Gao Chao, Yang Ting(1)

Abstract: From the study on the service level ability of road system crossing Jiaoji Railway now, the article makes a count on the present situation of crossing road in the main city area, quantitatively analyzes the service level of the present road network, and evaluates it. According to the planned population development trend, the article qualitatively analyzes the demand of passage crossing railway, and puts forward the improvement proposals for the passage crossing railway based on the road network.

Keywords: road network of main city area, crossing, Jiaoji Railway, Jinan Chity

Master Design and Key Technology of Tianjin Binhai New Area Qingfang Avenue Widening Reconstruction

Project Cao Lisong (6)

Abstract: The article briefly introduces the master design of Tianjin Binhai New Area Qingfang Avenue Project, and sums up the key technical issues of this project in detail. The relative experience can be referred for the similar projects.

Keywords: widening reconstruction project, master design, treatment of key technical issues, different settlement of new and old roadbeds, foam light soil, Tianjin Binhai New Area

Discussion on Design of Reconstructing Guihuang Highway into Urban Expressway

..... Hu Zhangli, Yang Ming, He Ping(10)

Abstract: This paper analyzes the utilization of old roads, the design of plane, profile and cross section of road, and the design of entrance and exit between master road and relief road aiming at some problems existing in the design of reconstructing Guihuang Highway into an urban expressway, which can be referred for the design of reconstructing the mountain highway into urban expressway.

Keywords: urban expressway, the plane, profile and cross section of road, design, entrance and exit

Master Design of Qingmai Expressway Reconstruction Engineering Scheme

..... Li Wendong, Wei Jin, Pu Beichen(13)

Abstract: With the continuous development of urban space, the expressway connecting two urban areas within a city has become the influence factor to restrict the rapid city fusion and the land development utilization. Therefore, it is necessary to reconstruct the expressway into the urban road. Taking Tianshui City Qingmai Expressway as an example, the article analyzes the reconstruction reasons and the function position after its reconstruction, and studies the master reconstruction design from six aspects of road, node, bridge culvert, drainage, traffic engineering and greening.

Keywords: expressway, municipal, reconstruction scheme, master design

Study on Reconstruction Design of Wanzhou Tiancheng Connecting Road

..... Lv Chengli, Li Yang, Zhao Ke, Li Shufang(18)

Abstract: Wanzhou Tiancheng Connecting Road is a typical mountain city reconstruction project. Its terrain along the road is complex with the different elevations, more buildings hard to be relocated at both sides, and more ground and underground structures with many factors hard to collect the information and to control. According to the above conditions, the design focuses and the difficulties are comprehensively considered in the design in order to handle the connection and the traffic conversion of the newly built roads and the old roads, the relationship of the newly built roads and the surrounding buildings at both sides, and the unified coordinating relationship of the newly built roads and the land development construction. The article sums up and analyzes the problems in the design and construction of mountain city reconstruction project, and puts forward the design idea and the countermeasures.

Keywords: mountain city road, reconstruction project, design idea

Design of Traffic Organization for Reconstruction of Zhangjiang Interchange in Pudong Section of Inner Ring Line in Shanghai Chen Hongpo(21)

Abstract: The rapid reconstruction of Pudong Section in Inner Ring Line of Shanghai advances Zhangjiang Interchange to the hub interchange. The article introduces the traffic organization scheme of this interchange after reconstruction, and focuses introduction on the design of traffic sign and marking guide system for the interchange, which can be referred for the design of traffic organization for the similar projects.

Keywords: reconstruction of interchange. Traffic organization, guide system

Discussion on Layout Optimization of Public Parking Lot in Central Area of Jinan City Based on Reconstruction of Central Area Sui Chunguang, Yu Xingtao, Wang Zhe(24)

Abstract: The urban traffic is a great system and the parking lot is an organically composed component in this great system if urban traffic. The static traffic and the dynamic traffic are composed into a complete traffic system. The bad static traffic will seriously affect the dynamic traffic. The emergence of a large number of private cars makes the “parking difficulty” of urban central area more severe. On the one hand the mutual interference of the static and dynamic traffics will cause the reduction of road traffic capacity, and on the other hand the exhaust gas from the long-term low-speed driving cars will bring the serious pollution to the urban environment. As for the important urban infrastructure of parking lot and based on analyzing the parking status of the central area in Jinan City, the article comprehensively analyzes the influence factors on the planning layout of public parking lot, and according to the reconstruction of the central area of Jinan City, puts forward the layout most suitable for the parking lot of central area and the planning management measures of public parking lot land in the city development.

Keywords: public parking lot, planning layout of parking lot in central area, reconstruction of urban central area, parking scale

Analysis on Characteristics of Comprehensive Traffic Planning in Chemical Industrial Zone Gao Ming(27)

Abstract: The chemical industrial zone is greatly significant for the development of city, but is more different from the city areas because of its closure, higher security requirement, no daily leisure travel, no permanent resident population and etc., and there is still no standard to guide the chemical industrial zone to compile the comprehensive traffic planning. Aiming at the characters of the zone, the article puts forward the characteristics and matters for attention in the compilation of the comprehensive traffic planning of the chemical industrial zone, and demonstrates the case of Caofeidian Chemical Industrial Zone.

Keywords: chemical industrial zone, comprehensive traffic planning, Caofeidian Chemical Industrial Zone

Preliminary Discussion on Design of Road Landscape at Urban River Embankment Zhang Weiping, An Yang(33)

Abstract: With the development of society, the function of urban river embankment is not only for the flood control and disaster mitigation, but also integrates the flood control, ecology and landscape in order to satisfy

the landscape requirements of the ecological urban development. The relative experience can be referred for the similar projects.

Keywords: river embankment, landscape design, landscape node

Elementary Analysis on Profile Design of Interchange Ramp Yu Hua (36)

Abstract: The article sets forth the master principle of profile design of interchange ramp. Aiming at the characteristics of high design comprehension of interchange ramp, interrelationship between the plane and the profile, and mutually conditioning among ramps, the article puts forward the opinions and proposals for the profile design, profile gradient alignment sequence and super-elevation design of ramp.

Keywords: interchange, ramp, profile design

Design and Construction of Intelligent Traffic Management Facilities in Wuhan

..... Tao Ling, He Dan, Jiang Le, Zhou Jun, Che Libin(39)

Abstract: The article describes the definition of intelligent traffic management system, analyzes the present situation and the existing problems in the intelligent traffic management facilities of Wuhan City, and puts forward the proposals for the design and construction of the intelligent traffic management facilities in Wuhan according to the experience of the same cities.

Keywords: intelligent traffic management facilities, design, construction

Intelligent Traffic Communication System of Urban Expressway Xiong Qipeng, Zhang Jie (42)

Abstract: The intelligent traffic communication system of urban expressway is the basic supporting platform of urban expressway intelligent traffic system, is responsible for the information transmission and exchange of intelligent traffic system, and is the key factor whether or not successfully to construct the intelligent traffic system. Based on the former engineering experience, the article introduces the communication channels and communication system of the current urban expressway intelligent traffic communication system from the angles of design and construction in China, which can provide the technical support for the construction of urban expressway intelligent traffic communication system.

Keywords: urban expressway, intelligent traffic, communication system, communication channel, information transmission, information exchange

Analysis and Application of Energy Conservation in Urban Roads Wu Hailing(45)

Abstract: Based on the requirements of the national “energy conservation and emission reduction” policy, the article analyzes the effect and the practical application of the newly built roads in the energy conservation from the situation of roads. The relative experience can be referred for the similar projects.

Keywords: urban road, energy conservation, analysis

Application of Foam Light Soil Technology in Soft Soil Subgrade Treatment of Road in Binhai Area

..... Bian Jiang(48)

Abstract: The foam light soil has the physical and mechanical properties of light, high fluidity, low permeability, self-reliance after curing, good integrity, low elastic damping, strength adjustability, heat insulation, durability and etc., and can solve the difficulties of great settlement and etc. after the treatment of soft soil subgrade in Binhai Area. The technology can reduce the land requisition and removal caused by the surcharge preloading slope and shorten the construction period. According to the practical cases, the article discusses the application of foam light soil in the soft soil subgrade treatment of road in Binhai Area, which can be referred for the similar projects.

Keywords: foam light soil, additional stress, settlement after construction, soft soil subgrade, application

Research on Grouting Disposal Technology for Serious Slab Staggering of Airport Cement Concrete Pavement ...

..... Lu Jianbo(51)

Abstract: The slab staggering is a common fault of airport cement concrete pavement. This fault will impact the comfortableness of aircraft, and even pose a security risk for the aircraft flight if seriously. A large range of precision uplifting pavement slab is firstly grouted for an airport in Shanghai of China in order to eliminate the slab staggering of pavement. The engineering is involved to the precision uplifting control and no-stop construction security control, which have the great engineering difficulties. The article analyzes the key technical parameter determination method in the grouting scheme of this project, derivates the minimum grouting pressure calculation formula, introduces the calculation method of fluid diffusion radius, selects the grouting depth and control index, and draws up the monitoring scheme. With the help of the finite element software and by the numerical simulation, the analysis shows that pavement stress state during slab uplift is safe and controllable. The research findings of this project can offer reference data for the similar projects of airport and highway industry in China.

Keywords: airport, cement concrete pavement, slab staggering, grouting, slab uplift

Elementary Discussion of Local Hot Recycling Pavement Fault Treatment of Yingbin Avenue in Putian City

..... Liang Wensen(55)

Abstract: The article introduces the local hot recycling pavement fault treatment of Yingbin Avenue in Putian City, analyzes the fault status of old pavement, especially puts forward the pre-treatment contents, and focuses setting-forth on the experimental analysis, construction technology and quality control of integrated local hot recycling pavement. The results can be referred for the similar projects.

Keywords: Putian City, Yingbin Avenue, pre-treatment, integrated hot recycling, experimental analysis, construction technology, quality control

Study on Common Faults and Countermeasures in Current Municipal Road Excavation and Repair Project

..... Jiang Changgu(57)

Abstract: The article introduces the common faults in the current municipal road excavation and repair projects, analyzes the fault causes, and puts forward the countermeasures for the current municipal road excavation and repair projects in order to improve the excavation and repair engineering level of municipal roads.

Keywords: municipal road, excavation and repair engineering, fault, countermeasures

Fault of Old Cement Concrete Pavement and Its Treatment Measures

..... Shang Zhaojuan(60)

Abstract: The reinforcing design of old cement road is different from the design of new pavement. Its design aim is to satisfy the traffic demand within a certain time. Therefore, the suitable design reference period should be determined according to the road grade, traffic flow, reconstruction and extension planning, and experience in the reinforcing design of old road. Taking Puxing Highway (Outer Ring Line ~ Area Boundary) Reconstruction Project as an example, the article sets forth the design process and method of cement pavement overlaying asphalt surface, which can be referred for the similar projects.

Keywords: old cement concrete pavement, fault, treatment measures

BRIDGES & STRUCTURES

Master Design of Dongbao River Xinan Bridge

..... Liao Lianjiao(63)

Abstract: The article introduces the master design of Dongbao River Xinan Bridge Project. This bridge is an intercity crossing-river urban bridge connecting Shenzhen City Shajing Town Xinhe Avenue. Its total length is about 1.45 km, in which the total length of bridge (156-m shipping span) is about 1.08 km and is about 74.5% of the total line length. The road networks at the both sides of Dongbao River will be more perfected after the completion of bridge.

Keywords: Dongbao Xinan Bridge, master design, intercity crossing-river urban bridge, selection of bridge type

Comparison and Selection of Technology and Economy of Main Bridge Scheme of Sanlu Highway Crossing-channel Bridge Chen Jianfeng (67)

Abstract: The article compares, selects and proves the technologies and economies in the aspects of the main bridge spans, the main bridge types and the main beam types, and finally comprehensively determines the scheme of the main bridge, which can be referred for the comparison and selection of the other large bridge schemes.

Keywords: scheme of main bridge, span, bridge type, beam type, technology and economy, comparison and selection

Design of Concrete Self-Anchored Suspension Bridge of Huangshui River Bridge on Wenhui Road in Xining City Song Kai(71)

Abstract: The Huangshui River Bridge on Wenhui Road in Xining City is a double-pylon 5-span (24+65+158+65+24)-m continuous concrete self-anchored suspension bridge. The article summarizes the design and calculation of this bridge. The semi-floating system is used for this bridge with the longitudinal dampers to control the displacement at the end of the girder. The single-box three-cell concrete section is used for the main girder. The height of the girder is 2.2 m. The bridge pylon is a concrete portal frame structure. The cross beam at the top of the pylons is a rectangular hollow section in which the pre-stressing steel strands are used. The separated base slab is used at the lower of pylon pier. Each base slab is supported by 6 bored cast-in-place piles with 2.2-m diameter. The main cables are respectively made up of ϕ 5.25mm galvanized high strength parallel steel wires. The suspension cables are of ϕ 7.0mm galvanized high strength parallel steel wires. The results of the calculation and analysis indicate that all checking calculations of this bridge can satisfy the relevant requirements in the codes.

Keywords: self-anchored suspension bridge, concrete box girder, main concrete pylon, main cable, damper, bridge design

Elementary Analysis on Scheme Design of Ningbo Xinjiang Bridge Xu Xin (74)

Abstract: The article introduces the new engineering scheme design of Ningbo Xinjiang Bridge, and analyses advantages and disadvantages of the different schemes from two aspects of "landscape function" and "traffic function". Its design idea can be referred for the similar projects in the future.

Keywords: urban road, selection of bridge location, scheme design, comparative analysis, landscape function, traffic function

Design and Construction of Main Bridge for Mulan Lake Bridge ... Liu Fengmin, Zhao Zhanwei, He Guoyou(77)

Abstract: Based on the natural condition of Mulan River with deep water and wide surface and the special geographical condition of large-sized ships hard to drive into lake, and according to the landscape requirement of Mulan Lake Scenic Spot, the (35+2 \times 60+35)-m pre-stressed concrete V-type rigid framework is used for the main bridge of Mulan Lake Bridge. The article focuses introduction on the scheme conceptions of this bridge and the characteristics of four bridge schemes, and sets forth the construction method of the recommended scheme.

Keywords: scheme conception, bridge characteristic, V-type rigid framework, structural design, construction scheme

Analysis on Structure Design and Stress of Low-pylon Cable-stayed Bridge in Beijing - Hangzhou Canal Song Lianfeng, Gao Jin(81)

Abstract: Hangzhou Kangqiao Road Canal Bridge is a main span 110m of three-span double-pylon double-plane low-pylon cable-stayed bridge. The article focuses introduction on the main design parameters and construction characteristics of its structure, and the spatial stress analysis, which can be referred for the design of the similar projects.

Keywords: low-pylon cable-stayed bridge, main concrete beam, concretion of pylon and beam, design

Study on Stress at Combination of Composite Girder Li Guofeng, Li Dan, Zhang Jing(84)

Abstract: The composite girder is a structure of steel girder and concrete girder combined by connector, bearing plate, pre-stressed bar or bolt at the longitudinal direction of girder. In recent years, the composite girder is widely used. The study on the stress character of its combination is especially important. According to the structural design of practical cases, the article sums up some rules able to be referred for the future designs.

Keywords: composite girder, transition section, shear key, stress state

Study on Deformation Performance Test of Steel Reinforcement and Concrete after Partial Opening of Concrete Component Wang Zibin(87)

Abstract: The article introduces the test of deformation performances of steel reinforcement and concrete after the partial opening of concrete component. In order to accurately test the strain in the tensile zone of concrete component during the static load test of bridge, it is usually required to dig out the partial concrete so as to stick the strain piece at the surface of steel reinforcement. In order to test and verify whether or not accurate is the strain of component in the tensile zone tested by this method, it is required to test the steel reinforcement strain piece and the concrete strain piece stuck at the lower border of precast pre-stressed concrete beam, to compare the strain between the both in same test condition, and at the same time according to the calculation results of the finite element model, to judge the influence of digging out the partial concrete on the strain of steel reinforcement.

Keywords: dig out of partial concrete, deformation of steel reinforcement, model test

Calculation and Comparison of 100-meter Continuous Rigid Frame Bridge Liu Tao (89)

Abstract: Taking a 100-meter continuous rigid frame bridge as the engineering background, the article calculates, compares and sums up the influences of the variables on the counter force of side support, the inner force of main girder and the inner force of main pier based on the variables of the main span number, the side span ratio and the plane alignment, which can be referred for the similar projects.

Keywords: continuous rigid frame, main span number, side span ratio, plane alignment

Application of Stiffened Framework in Concrete Arch Bridge and Study of Simulation Mode

..... Mi Xiliang, Su Yong(93)

Abstract: The stiffened framework construction method is commonly used in the long-span concrete arch bridge in recent years. According to a newly built crossing-river bridge in Fujian, the article briefly introduces the layout and construction of the stiffened framework, and discusses three simulation methods of the stiffened framework commonly used in the calculation of construction stage. The calculation and comparison results show that the beam - slab composite model is sufficiently accurate and dependable.

Keywords: concrete arch bridge, stiffened framework, simulation mode, beam - slab composite model, beam - entity composite model

Seismic Performance Evaluation of Modern Urban Bridge and Its Security Countermeasures Liu Xin (97)

Abstract: China is a country where the earthquakes happen frequently. The earthquakes of Tangshan, Wenchuan, Yushu have caused the serious loss to the life and property of the people. The destruction of urban bridge structure caused by the earthquakes leads to the direct loss, and also cuts off the rescue lifeline, which results in the rescue teams and the rescue goods hard to arrive in the disaster areas in time and seriously affects the rescue work after disaster. The article further discusses the seismic performance evaluation method of modern urban bridge and the security countermeasures of bridge seismic design, which can be referred for the construction of the similar projects.

Keywords: modern bridge, seismic performance evaluation, security countermeasures

Security Evaluation of Steel Reinforced Concrete Bridge Based on Time-dependent Reliability Theory

Feng Ying(99)

Abstract: The article introduces a method for the security evaluation of steel reinforced concrete bridge. The reliability of bridge is calculated and analyzed according to the special character of steel reinforced concrete bridge during the security evaluation of the existing bridges. The article considers the concrete carbonization and the structural resistance degradation caused by steel bar corrosion in the use process of steel reinforced concrete bridge, and establishes the resistance degradation model of structure. Based on the difference of evaluation base period, the time-dependent load effect model is established. Finally, the reliability index of structure is calculated by JC method so as to evaluate the structure reliability of the existing bridges.

Keywords: steel reinforced concrete, reliability, concrete carbonization, steel bar corrosion, resistance degradation model, JC method

Design and Application of Bailey Truss Form Traveler

Xue Wuqiang (105)

Abstract: The cantilever pouring method is a construction method commonly used for a long-span pre-stressed continuous beam bridge. The form traveler is widely used for the cantilever pouring construction. The Bailey truss form traveler is widely used because of its characteristics of strong adaptive faculty, convenient use safety, lower construction cost and etc. According to the cantilever construction of Shanghai Zhenping Road Bridge crossing Suzhou River, the article studies the design and application of Bailey truss form traveler, and introduces its application, which can be referred for the construction of the similar projects.

Keywords: cantilever construction, Bailey truss, form traveler, design, application

Analysis on Crack Causes of Naner Bridge in Shilong Town of Dongwan

Li Jimin (108)

Abstract: Combined with the crack problem of Naner Bridge in Shilong Town of Dongwan, the article calculates the shear lag effect, transverse bending effect, distortion effect, vertical pre-stressing loss and temperature of box girder so as to qualitatively analyze the crack causes of Naner Bridge.

Keywords: crack, shear lag, transverse bending, distortion, vertical pre-stressing loss

FLOOD CONTROL & DRAINAGE

Design of Rainwater Collection and Utilization System of Urban Road Pavement

Yu Xiao (110)

Abstract: With the further acceleration of urbanization, the contradiction of urban water shortage is also further deepened, and the environmental and ecological problems are also synchronously expanded. In order to solve the contradictions among water shortage, environment, ecology and etc., the collection and utilization of rainwater are becoming more and more important, the development and application of urban rainwater utilization technology also emerge as the times require. The urban road pavement rainwater collection and utilization system introduced in the article is a kind of low cost, convenient and fast effect of urban road pavement rainwater collection and utilization system. By adjusting the cross section layout of road and adding the rainwater collection facilities, the rainwater of road pavement firstly flows into the rainwater inlet of road and then flows into the underground blind ditch network to achieve three functions of rainwater filtration, greening irrigation and greening water storage.

Keywords: urban road pavement rainwater collection and utilization, break-stone blind ditch, water grate, catch basin

Study on Countermeasure of Flood Control and Drainage in Qingdao Downtown

Liang Chun, Liu Jianhua, Sun Weifeng, Zhang Yuzheng, Fang Juan (115)

Abstract: Urban waterlog can not only cause traffic jams, but also cause heavy loss to people's lives and property. According to the investigation and analysis of the present situation and the main problems in the

drainage and flood control facilities of Qingdao downtown, the article puts forward a series of engineering and non-engineering measures to populate the low-impact development concept, promote the rainwater utilization, properly improve the design standard and reasonably draw up the vertical planning, which have reference value and guiding significance for perfecting the urban drainage system and improving the flood control and drainage capacities.

Keywords: urban waterlog, flood control and drainage, preventive countermeasure, low-impact development, rainwater utilization

Study on Influence of Foundation Pit on Safety of Adjacent Flood Control Wall Hao Xuanming(118)

Abstract: With the fast development of the economy, the quantity of underground constructions in the downtown of Shanghai is increasingly increased, and the scale also becomes larger. The excavation of underground foundation pit will affect the safety of river flood control walls. Thereby, a safety issue of flood control has to be considered. Based on the analysis and summary of Lujiazui South Binjiang Triangle Greenbelt Garage project, the article contrasts the actual monitoring value and the calculation value of the influences of the underground engineering constructions on the flood control wall, and analyzes how to control the practical deformation of the flood control wall surrounding the retaining structure of foundation pit and how to avoid the damage of the flood control walls.

Keywords: foundation pit, numerical simulation, flood control wall, settlement, Shanghai

Preliminary Discussion on Seepage Control of Dongjihu Reservoir Shu Jin, Yuan Jian(123)

Abstract: On the basic of the seepage control treatment project of Nanjing Dongjihu Reservoir, the article preliminarily discusses the application of composite geo-membrane, clay blanket and vertical anti-seepage wall in dam seepage prevention. The article comprehensively analyzes the advantages and disadvantages of three treatment schemes from the anti-seepage effect, construction difficulty and economic rationality. The study shows that three schemes of dam seepage control treatment are feasible, can efficiently solve the seepage problem and improve the operation condition of reservoir. By the comprehensive analysis and comparison, the design scheme combining the horizontal seepage prevention of composite geo-membrane and the vertical seepage prevention of clay slope wall is used. The article demonstrates and analyzes the scientific rationality and feasibility of this scheme.

Keywords: seepage control, composite geo-membrane, clay blanket, vertical slope wall

Engineering Design of Sewage Interception Pipe in Wenzhou Lingkun Street

..... Bao Songkao, Yang Yong, Cai Danxin, Feng Chenfei(126)

Abstract: The scheme combining the small-sized sewage treatment system with wastewater treatment plant is used for the treatment of sewage in Lingkun Street of Wenzhou. This paper introduces the present situation of sewage treatment, the collection and treatment scheme of sewage, the design parameters of important links and technical gist in order to provide the experience for the design of village sewage collection and treatment.

Keywords: sewage interception, small-sized sewage treatment system, wastewater treatment plant, pipeline network

Elementary Discussion Impacts of Rail Transit Construction on Municipal Sewer Network System and Its Optimization Measures Xu Ying, Jiang Lanlan, She Bucun, Cai Danxin (129)

Abstract: An urban rail transit project is the comprehensive project with the great investment, long construction period and wide influence. The rail transit line is generally constructed in a crowded urban built-up area, and the line will be buried (metro) and overhead constructed (light rail) along the streets and roads. Therefore, it has a larger impact on the urban traffic, environment and municipal pipelines during its construction. Since the covering soil of the subway stations and the regions is usually 2 ~ 6m, and the covering area is larger, the excavation method is generally used in the construction, which has a large impact on the

gravity flow sewers at the same shallow underground space. The article analyzes the impact of rail transit engineering construction on the relocation construction and operation of sewage pipeline network, and according to some typical design cases, puts forward the optimization proposals and measures.

Keywords: rail transit, sewage pipeline system, pipeline relocation, optimization measures

Cause Analysis and Preventive Countermeasure on Combustible Gas and Dust Produced from Circulating System of Fluidized Bed Sludge Dryer Li Jianyong, Tong Fei, Zhou Piren, Sun Bin(133)

Abstract: Sludge drying incineration is an important link in the sludge treatment of large and medium-sized cities. Taking the sludge drying incineration of Shidongkou WWTP as an example, the dewatered sludge is fluidized at high speed in the circulating air, meanwhile, a lot of water in sludge is taken away by the circulating air, and at the same time certainly a large number of dust and combustible gas are produced. It is required to solve the problems for the technological technicians how to control the dust and combustible gas within the explosion limit and how to prevent the accidents. The technology of sludge drying incineration in Shidongkou WWTP has been improved to control the safety problem possibly caused by too large concentration of dust and the combustible gas exceeding the ultimate limit within the efficient range in order to guarantee the safe operation of technological equipment and successfully to solve the safety problem seriously restricting the fluidized bed sludge technology, which can be referred for the operation of the local similar equipment.

Keywords: urban sludge treatment, sludge drying incineration, dust control, combustible gas control, countermeasure, Shidongkou Wastewater Treatment Plant, Shanghai

MANAGEMENT & CONSTRUCTION

Technological Measures and Quality Control in Construction of Cement Stabilized Macadam Base Sun Wenbo, Xue Shuming(136)

Abstract: The article discusses the technological measures and quality control in construction of cement stabilized macadam base. The strength, service life and service quality of asphalt pavement are related to the strength and quality of base for the asphalt pavement. The most road bases are constructed by the cement stabilized macadam method in China. The engineering quality fault of cement stabilized macadam base is caused in the construction process because of the unperfected control system, which results in the greater difference of construction.

Keywords: material gradation, cement stabilized macadam base, cement stabilized macadam base, compaction degree, quality control, water content

Discussion of Key Link Construction Management in Construction of Asphalt Concrete Pavement Huang Cuimei(138)

Abstract: The article briefly discusses and sums up some key links, the relative technical indexes, the quality standards and the working focuses on the construction management in the construction of asphalt concrete pavement according to the engineering practical experience and the engineering quality requirements, which can be referred for the similar projects.

Keywords: asphalt, material, mixture, pavement, construction

Application of Thin Easy-compacted Asphalt Concrete Overlay Technology in Maintenance and Repair Engineering Xiong Liang, Ma Xiang, Huang Yong(140)

Abstract: The article discusses the application of thin easy-compacted asphalt concrete overlay. The paving thickness of easy-compacted asphalt concrete ECA-10 is 2.5 cm. The easy-compacting additive is used to guarantee the compaction degree of thin asphalt concrete. Its specific gradation can satisfy the anti-slip requirement of fine asphalt concrete as the surface layer. It is worth to popularize and apply the thin 2.5-cm easy-compacted asphalt concrete overlay as the preventive maintenance measures of expressway because of

its excellent performance and economical construction cost.

Keywords: expressway, thin overlay, easy-compacted asphalt concrete

Study on Construction Treatment Practice of Soft Soil Subgrade in Municipal Road Construction Xu Hongsheng(143)

Abstract: The study of soft soil subgrade treatment technology in municipal road construction is a relationship with the future operating results of road. On the basis of summarizing the soft soil subgrade treatment mode, the article discusses the measures for reinforcing the soft soil subgrade, which can be referred for the similar projects.

Keywords: municipal road, soft soil subgrade, construction technology, reinforcing

Discussion of Common Quality Fault and Preventive Measures in Roadbed Construction Zhang Lizhong, Yang Fei(146)

Abstract: The roadbed is the most important component for the highways. As the pavement foundation, the construction quality of roadbed influences greatly on the highway pavement and is directly related to the whole highway construction quality. The article briefly introduces the characters of common quality faults in the roadbed construction, analyzes the problems commonly in the roadbed construction of China, and discusses the causes and the preventive measures of common roadbed faults in order to improve the highway construction quality.

Keywords: roadbed construction, common quality fault, preventive measures

Study on Construction Monitoring Technology of Long-span Steel Truss bowstring Arc Bridge Lai Yunshen, Huang Tianli(149)

Abstract: Taking Ganzhou City Gannan Avenue New Century Bridge as the engineering background, the article studies the monitoring technology of the long-span steel truss bowstring arch bridge used in the cantilever erection construction. The Midas/Civil finite element software is used to simulate and calculate the whole construction process of long-span steel truss bowstring arch bridge in order to achieve the theoretical data of the displacement, stress and reaction force of the structural components under the different control conditions. The stresses of the key control sections (arch top, L/4, arch foot) and the alignment of each control point are monitored in the process of structural cantilever erection. According to the errors between the measured result and the theoretical result, the article puts forward the control adjusting measures in order to ensure that the built bridge alignment and the stress state can satisfy the standards and the design requirements.

Keywords: steel truss bowstring arch bridge, construction monitor, finite element analysis, alignment, stress

General Situation of Scheme Design and Construction of Yonghe Avenue Overpass Bridge Zheng Wen(154)

Abstract: In order to satisfy the increasing demand of traffic volume, it is required to reconstruct the intersection of Yonghe Avenue and Yongshun Avenue. Yonghe Avenue Overpass Bridge is proposed to construct continuously to span Yongshun Avenue and the existing Yonghe Avenue Bridge, and an existing bridge is proposed to use as an auxiliary road. The bridge is constructed by the long-span Bailey support to protect the existing bridges. The article mainly introduces the design and construction of this bridge. At present, this bridge has been basically completed to open for the traffic.

Keywords: Yonghe Avenue Overpass Bridge, scheme design, long-span Bailey Support

Application of Double-layer Steel Sheet Pile Cofferdam in Construction of Punan Canal Bridge in Fenggan Road Weng Huixia(157)

Abstract: Aiming at the practical situation of Punan Canal Bridge in Fenggan Road, the article introduces the application of the double-layer steel sheet pile cofferdam in the construction, describes the design, con-

struction technology and construction monitor of steel sheet pile cofferdam and its dismantlement, and sums up the key technology of steel sheet pile cofferdam.

Keywords: bridge construction, double-layer steel sheet pile cofferdam, construction technology, construction monitor

Study on Key Technology of Long-span Cast-in-situ Steel-concrete Composite Beam Deck Zhou Dan(160)

Abstract: Taking a span (56.45+115.3+44.5) m of steel-concrete composite beam bridge as an engineering case and aiming at the construction of this bridge spanning an expressway, the article analyzes the technical difficulties that the concrete is hard to pour once under the influence of skylight points. The pouring sequence by sections is determined to firstly pour the bridge deck of side span, then to pour the deck of the middle section of the middle span and finally to pour the deck at the top of pier so as to ensure the connecting quality between the bridge deck and steel beam during the composting of steel beam, and introduces and sums up the key technologies of steel-concrete composite continuous beam deck in detail.

Keywords: long span, cast-in-situ steel-concrete composite beam, pre-stressing application, pivot weight

Elementary Discussion on Tensioning Control of Prefabricated Box Beam by Tensioning Method in Bridge Construction Miao Cheng(163)

Abstract: With the fast development of economy and society, the infrastructure is more and more perfected and the bridge engineering project is more and more constructed in China. In the bridge engineering construction, the tensioning control of prefabricated box beam by tensioning method will directly affect the security and service life of bridge engineering. Therefore, the engineering members are required to do the tensioning control of prefabricated bridge box beam by tensioning method after the construction well. The article focuses summarization on the prefabricated box beam by tensioning method after bridge construction, discusses and analyzes its tensioning control, which can be referred for the similar projects.

Keywords: bridge construction, prefabricated box beam by tensioning method, tensioning control, analysis

Control of Construction Technology Quality for Cast-in-situ Box Beam by Bracket Method Liu Junmin(166)

Abstract: The construction with brackets is suitable for the simple-supported beam and the continuous beam with the lower piers able to span the dry lands and the shallow rivers in the better subgrade conditions. The full-supported bracket is suitable for the construction in the area with the flat and a little undulating terrain, and the beam-column bracket is suitable for the high embankment and dyke with the greater undulating terrain. The article sets forth the construction with brackets in detail. The relative experience can be referred for the similar projects.

Keywords: bracket method, cast-in-situ box beam, technical requirement, construction technology

Study of Bridge Pre-stressing Engineering Construction Technology Pan Jinfeng, Hu Congjian(169)

Abstract: The study of bridge pre-stressing engineering construction technology has the quite strong practical guiding function. The article briefly analyzes the construction technology of bridge pre-stressing engineering, and further discusses the common quality problems and solving measures, which can be referred for the similar projects.

Keywords: bridge, pre-stressing engineering, construction technology

Elementary Discussion on Construction Security Control Technology of Highway Bridge Hu Congjian, Pan Jinfeng(172)

Abstract: The security control technology is very important in the construction of highway bridge. The article analyzes the causes of security accidents commonly in the highway bridge, and discusses its security control technology in detail, which can be referenced for the study of these aspects.

Keywords: highway bridge, construction security, control technology

Study on Maintenance Reinforcement Quality Inspection and Evaluation of Steel–Concrete Composite Bridges

..... Huang Yingjun(175)

Abstract: After service and operation for more than twenty years, the steel–concrete composite bridges built in early stage have step into the first stage of life cycle in China. Due to deterioration of structural materials and component performances, corrosion of external environment, overload operation and the other unconventional factors, the bridge diseases such as bridge deck damage, steel girder corrosion and etc. begin to appear. This paper introduces the study on maintenance and reinforcement measures, and reinforcement quality inspection and evaluation for this kind of bridges in this stage. The paper firstly studies the common diseases and the corresponding maintenance reinforcement measures for this kind of bridges, sums up five measures basically covered maintenance and reinforcement methods for this kind of bridges in current stage, that is, anticorrosion and recoating of steel girder, replacement of concrete bridge deck, replacement and treatment of component joints for steel girder, dimensional checks and correction of component and bar, and crack repairing of steel girder, then establishes the corresponding index systems of quality control, inspection and evaluation for various treatment measures, and gives the evaluation standards and inspection methods for the inspection indexes.

Keywords: steel–concrete composite bridges, bridge diseases, maintenance and reinforcement, inspection system, inspection index

Environmental Effects and Control Measures of Open Caisson Construction

Hu Rulan (180)

Abstract: Aiming at the influence of open caisson construction on its surrounding environment, the article puts forward the concept of environmental benefits and takes the reasonable preventive measures to make the project achieve the best economic and social benefits. The results can be referred for the design and construction of the similar projects.

Keywords: open caisson, settlement, monitoring, foot blade, environmental effects, preventive measures

Application of Deep Foundation Pit Excavation Supporting Technology in Yuda.Nanjiao Huadu Phase II Project

..... Wang Zheng (183)

Abstract: The foundation pit engineering is mainly including the design and construction of pit supporting system, and its soil excavation, and is a quite strong comprehensively systematical project. It is required that the geotechnical engineering and structural engineering technical members should be closely cooperated. The supporting system of foundation pit is a temporary structure, and is not wanted after the completion of underground engineering construction. Its safety stock is smaller and its risk is greater because of the pit supporting system as the temporary structure. The engineering construction process of foundation pit must be monitored with the emergency measures. The timely rescue is needed once a danger appears in the construction. According to the practical engineering cases, the article introduces the deep foundation pit excavation supporting technology used in this project. The deep cement mixing pile is forced to mix the soft soil or sand with the hardening agent of cement at the subgrade by deep mixing mechanism to make the soft subgrade hardened in order to improvement the subgrade strength. This method is suitable for the deep cement mixing pile to treat the soft subgrade of silt, sand soil, silt soil, turf soil and powder soil. Its effect is obvious with pile and wall after treatment.

Keywords: deep foundation pit supporting, cement mixing pile, cast–in–situ pile

Study on Current Municipal Road Rainwater Drainage Engineering Construction Technology

..... Shen Rongkang (185)

Abstract: The study of current municipal road rainwater drainage engineering construction technology is an important task. According to the engineering practices, the article analyzes the design of municipal road rainwater drainage system, the preparation work before construction and the construction technical gist, which can be referred for the similar projects.

Keywords: municipal road, rainwater, drainage engineering, construction technology

Elementary Discussion on Construction Technology of Repairing Steel Casing Pipe and Reinforcing Sewage Pipe

..... Zhang Wei(187)

Abstract: The sewage pipe is an important component in the urban water supply and drainage engineering, and is significant to improve the environment quality of city. According to Pudong (N) Road Sewage Pipe Repairing Project, the article introduces the construction technology and quality control of repairing the steel casing pipe and reinforcing the sewage pipe, which can be referred for the similar projects in the future.

Keywords: sewage pipe, reinforcement, settlement, steel casing pipe

Discussion on Construction Technology and Measures of Shield Crossing Rail Traffic Line Han Lei(190)

Abstract: The article introduces the construction technology and measures taken for the shield to cross the underground area of Rail Traffic Line 4 during the construction of Shanghai Expo Park Tunnel Project. Fully understanding the surrounding environment, adjacent structures, pipelines, shield machines and specific hydrogeological conditions, the shield crossing is divided into three stages of collecting the shield driving parameters in the test driving stage, controlling the shield construction parameters in the crossing stage and carrying out the late filling grouting in the stage after crossing according to the settlement monitor. It is also to consider the driving technical measures for crossing the metro lines in the poor stratum, do the monitor work well of tunnel axis, ground settlement deformation and adjacent structure pipelines, do the informatization construction management well, and make the data collect in time, analyze in time and guide construction in time, and lay down the emergency plans. The results can be referred for the similar projects.

Keywords: tunnel engineering, to cross rail traffic line, construction technology, technical measures for poor stratum, emergency plan, Shanghai

Analysis and Study of Expressway Tunnel Construction Technology Peng Xijian, Huang Hualong (195)

Abstract: With the fast development of economy and society, the scale and number of highway construction are more and more large in China. It is required to design and construct the tunnels in the expressway construction of the partial areas. The expressway construction members are required to construct the projects according to the scientific construction technologies in order to guarantee the quality of expressway construction and the construction security of construction members. The article focuses discussion and analysis on the construction technology of expressway tunnel, which can be referred for the similar projects.

Keywords: expressway, tunnel construction, technology, analysis, study

Analysis and Countermeasures for Sinking Causes of Pavement Led by Unexcavated Pipeline Construction

..... Fang Zhenwei(198)

Abstract: With continuously strengthening the construction of urban infrastructures and continuously perfecting the facilities, the construction of sewage pipeline projects is increased, and the municipal sewage pipeline network is basically realized to cover the whole Wuxi. As a pipeline embedding construction technology by un-excavation or a little excavation, the un-excavation construction method plays the great role in the full covering process of municipal sewage pipeline network. However, the situation of pavement sinking, river sending out the black water and etc. appears after its putting into operation, which causes the bad social influence. The article sets forth the pavement sinking causes by the un-excavation construction and the issues required for attention in the construction.

Keywords: un-excavation construction, pavement sinking, jacking pipe, curve jacking pipe, traction pipe

Elementary Discussion on whole-process Cost Control of Construction Project Invested by Government

..... Tang Jun(200)

Abstract: "Government investment construction project" is gradually formed with the reform of economic and

political systems in China, and in practice, is also known as the “public finance investment project” or “national construction project”. It mainly includes the investment projects within and out of financial budget capital (including treasury bonds), national sovereignty debt fund projects, projects using various special construction funds, and the other government investment projects stipulated by the laws, the regulations and the people's government. The article sets forth some gist for the whole-process road control of “government investment construction project”, points out that the whole-process cost control of “government investment construction project” should be implemented throughout every stage of project proposal, scheme design, bid and tender, implementation, completion examination and acceptance, price appraisal and audit, achievement evaluation and etc. In order to guarantee the realization of investment aim, and to achieve the excellent economical and social benefits, the scientific management method and the efficient control measures are taken according to the work characteristics of every stage in order to reach the aim of engineering cost control.

Keywords: government investment construction project, whole-process const control, design optimization, standard bid and tender, price appraisal

Elementary Analysis on Life Cycle Cost Management and Its Application in Airport Runway Overhaul Project ...

..... Zhao Xu(204)

Abstract: The study category of life cycle cost management is the whole life cycle of engineering project. Its initial investment is relative larger, but its later cost control is high efficiently and its sustainable superiority is very obviously. The article introduces the application of life cycle cost management in the practical projects. Based on the concept of life cycle cost control and after the scientific comparison, Shanghai Hongqiao International Airport East Runway Overhaul Project is constructed without closing the airport by medium bed overlay mode. In the project construction, the concept of life cycle cost management is applied from an all-around point of view to make a project achieve the good benefits in the aspects of economy, environment and society, which can provide a good sample and demonstration for the engineering construction of the civil aviation airports of China, especially for the overhaul reconstruction of the old runways.

Keywords: life cycle, cost management, Hongqiao International Airport, overhaul of East Runway, application and effect

Discussion of Full-process Construction Cost Control of Construction Project Based on Engineering Construction Cost Consultation

..... Lu Xiuqin(208)

Abstract: The full-process engineering cost control of construction project is a huge system engineering integrating the economy, technology, construction and management. Therefore, it is harder to efficiently control the engineering cost. The article discusses the full-process cost control of construction project in the preliminary designs stage, construction drawing design stage, bidding and tendering stage, construction stage and completion settle accounts stage of project mainly from the angle of engineering cost consultation in more detail, which can be referred for the similar projects.

Keywords: engineering cost, engineering consultation, full-process construction cost, construction cost control

Understanding of Improving Preparation Quality of Engineering Budget

..... Guo Chen(210)

Abstract: According to the budget preparation of the construction drawings for many years, the article introduces some experience of improving the preparation quality of engineering budget. The engineering budget preparation members should continuously improve the professional quality, continuously accumulate the design and construction experience, and continuously communicate with the designers and carry out the field surveys besides doing the preparing work, being familiar with the construction drawings, calculating the engineering quantity, mechanically applying the fixed unit prices, and calculating all other fees, profits and taxes so as to finally achieve the purpose of improving the budget preparation quality. The experience can be referred for the similar projects.

Keywords: engineering budget, preparation quality, experience

Elementary Discussion on Financial Risk Management of EPC General Contract Project Liu Honghua(212)

Abstract: EPC general contract project management mode is the mode of the general engineering contract signed by the owner and the general contractor, i.e. the owner contracts the construction project to the general contracting unit, the general contracting unit is responsible for the design, purchase and construction of the whole construction project, and has the full responsibility for the quality, security, project period, construction cost and etc. of the contracted construction project, and finally the general contracting unit can provide a construction project conforming to the contract stipulation, satisfying the service function, possessing the service conditions and qualifying the completion, test and acceptance. In recent years, this mode has been more and more used in the building market in China because of this mode able to bring the owner the excellently comprehensive service functions. In the practical operation of project, the profit making abilities of project are often different because of the different project management capacities, fund management control capacities and cost control capacities of the project management members. How to play the function of financial personnel, to efficiently carry out the financial risk management and to improve the profit making ability of project has become an important aspect of EPC project management. The article analyzes the risks possibly existing in the financial management of project according to the practical engineering experience, and discusses the thought and method of financial risk management under the EPC general contracting mode, which can be referred for the other financial personnel.

Keywords: EPC general contract, financial management, risk

Discussion on How to Strengthen Quality Management of Municipal Road Engineering Project Pan Chengzhi(214)

Abstract: To strengthen the quality management of municipal road engineering project is not only a necessary means to set up the government image, is but also related to the trip convenience and security of the common people. The article analyzes the impact factors in the quality management of municipal road engineering project, sums up the problems existing in this current work, and discusses the measures to strengthen the municipal road engineering projects, which can be referred for the similar projects.

Keywords: municipal road, engineering project, quality management

Elementary Discussion on Lease Management Mode of Mechanical Equipment Sun Huipeng(217)

Abstract: The lease of mechanical equipment is adapt to the demand of market economic development and is the effective way to improve the use efficiency and the economic efficiency. How to do the leasing management of mechanical equipment well, the article sets forth the bold innovation to establish the leasing companies, the scientific management of leasing target, cost accounting and mechanical equipment, and the establishment of information network to expand the leasing way, which can be referred for the similar industries.

Keywords: mechanical equipment, leasing model, economic objectives, scientific management

Application of Overall Planning in Project Chen Jihong (219)

Abstract: The article introduces how to apply the overall planning and the scientific arrangement to reduce the risk, to reduce the investment and to shorten the construction period in the prophase pipeline removal in order to make various works smoothly implemented in the simultaneous implementation of Metro Line 7 Reconstruction Project, Humin Elevated Road Project and Guilin Road Project located at intersection of Guilin Road and Humin Road in the construction of Shanghai Railway Station (South) Project. The application of overall planning in the projects provides some reference for the implementation of the similar projects.

Keywords: engineering pipeline implementation, overall planning and reasonable arrangement, overall planning of engineering, application

Analysis and Evaluation on 2007 ~ 2011 Achievements of Top 100 Survey and Design Enterprises in China - - - Shi Shuqin(222)

Abstract: *The National Engineering Survey and Design Enterprise Statistics Compilation* is the summary of the top 100 survey and design enterprises and industries with the annual operation revenue issued by the Ministry of Construction. Based on 2007~2011 Compilation, the article analyzes the development of the survey and design enterprises in recent five years in order to better understand the development situation of the industries and enterprises.

Keywords: survey and design, top 100 enterprises, achievement, operation revenue, analysis and evaluation

STUDY ON SCIENCE & TECHNOLOGY

Study on Traffic Capacity and Improvement Countermeasures of Urban Roundabouts Kong Lingqi(228)

Abstract: Roundabouts always become a bottleneck of the urban road traffic. This article discusses the capacity calculation method of roundabouts without signal control, application conditions, optimization methods and improvement strategies in detail. According to the situations of the roundabout, the article analyzes the traffic organization design of roundabout, and confirms the phase setup and the main traffic parameters of signal lamp. The result indicates that the improvement is feasible for roundabouts.

Keywords: roundabout, traffic capacity, intersection evaluation, traffic improvement

Discussion of Seismic Input Model under Multi-support Excitation and Study of Finite Element Software Realization Method Luo Yu (232)

Abstract: For analyzing the seismic response of long-span structure, it is required to consider the influence of multi-support non-uniform excitation. Based on the dynamic equilibrium equation, it is further to derive the seismic response analysis of displacement input model and the acceleration input model under the multi-support excitation. The article puts forward three practical methods - large mass method, large stiffness method and direct displacement method of suitable for the multi-support seismic input model by the currently common finite element software, sets forth the calculation principles of various methods in detail, and analyzes the multi-support excitation seismic response by the different methods based on SAP2000 software platform and according to the engineering background of a suspension bridge with the main 850-m span, and finally briefly analyzes the response law of long-span suspension bridge under the multi-support seismic response.

Keywords: multi-support excitation, seismic input model, large mass method, large stiffness method, absolute displacement input method

Analysis and Study of Stress Characteristics of Single-span Composite Masonry Arch Zhang Siguo, Qi Yanping, He Yubao(238)

Abstract: With the increment of traffic flow and the reduction of self-bearing capacity of structure, more and more stone arch bridges can not satisfy the service requirements. As the important cultural heritage of China, the protection of stone arch bridge is particularly important. Therefore, the reconstruction and copying restoration of stone arch bridge are more and more implemented. The new structural system is often used in the reconstruction and copying of stone arch bridge. In the new structural system, the other components and the stone arch are commonly coordinated to stress and together to bear the external load. The reconstructed structure is the stone - concrete composite arch bridge. There is a little study on the stress mechanism of composite arch bridge now. According to the reconstruction project of a stone arch bridge, the article studies the stress functions of composite arch bridge.

Keywords: composite arch bridge, mechanical properties, parameter analysis

Analysis on Comfort of Lower Suspended Footbridge Caused by Traffic Load Wu Pu, Wu Dongyan, Xie Xu, Song Lianfeng(242)

Abstract: The footbridge is suspended between two main bridges. This design method is firstly used in China. The rigidity of suspended structure is smaller. The vibration caused by the traffic load of main bridge will directly impact the comfortable feeling and security feeling of the pedestrians. Therefore, it is required to specially study the comfortable issue of this footbridge. Using the coupling vibration of vehicle and bridge, the article analyzes and studies the vibrating response of footbridge caused by the vehicles passing bridge according to a large number of numerical simulations. The result shows that the comfort of footbridge basically satisfies the requirements when the vehicle number (heavy vehicle) is less than 10 vehicles / side under the good condition of pavement. The pavement smoothness greatly impacts the comfort, but the driving speed does not obviously impact the comfort of footbridge.

Keywords: suspended footbridge, coupling vibration of vehicle and bridge, comfort, vibration response, pavement smoothness, driving speed

Study on Flow Field and Hydraulic Model of Fore-bay Diversion Measures for Super-large Urban Water Supply Pumping Station Wang Leilei(246)

Abstract: Aiming at the fore-bay flow field of large pumping station with multi-restriction, an incompressible turbulent fluid velocity field model and a multi-hydraulic model are established. The article calculates and analyzes the flow field improvement of fore bay and suction tank with the additional diversion cone and diversion pier by the finite volume method. The calculation result of numerical simulation shows that the influent drift angle of pump below the inlet is generally less than 4° with the additional diversion cone, which is useful to improve the drift effect of influent pump. In accident conditions, the average flow deviation ratio of pump for unilateral suction tank is reduced from 26.89% to 13.26%, and the flow field near the suction pipe is smooth and uniform. Hydraulic model tests show that the splayed diversion pier scheme for the fore bay of pumping station can effectively eliminate a wide range of existing back-flow zone and oblique flow zone, and strengthen the role of diversion by adjusting the flow ratio of water distribution holes. The maximum water level drop between the water distribution channel and the end of fore bay is 0.020 m by diversion pier rectification scheme, which meet the design requirements of the hydraulic design.

Keywords: diversion, flow field, pumping station, hydraulic model, hydrodynamics

Design of Buton Rock Asphalt (BRA) Mixture Mixing Ratio Based on Volume Method Yang Kai(250)

Abstract: On the basis of the volume method, the paper proposes the mixing ratio design method of BRA mixture according to the characteristics of BRA. This method is introduced into the mathematical model in the design, avoids the interference effect of BRA granule on the compound gradation, and improves the optimum asphalt content and VMA in BRA mixture. The testing results show that the volume method is quick and convenient, and the BRA mixture has the favorable volume parameters, which efficiently avoids the shortages of the traditional BRA mixture and has the excellent road performance.

Keywords: asphalt mixture, volume method, BRA, gradation, road performance

Analysis of Relationship between Asphalt Stabilized Crushed Stone Gradation Composition and High-temperature Stabilization by SSC Xie Xiaogang, Zeng Guangyong(252)

Abstract: In order to decide the relationship between the asphalt stabilized crushed stone base gradation composition and the high-temperature stabilization, the stone-on-stone contact (SSC) is used to evaluate the mutual contact compaction rate among the coarse aggregates. The article puts forward the detail relationship between SSC and dynamic stabilization according to a large of experiments, which can be referred for the mixing ratio design of asphalt stabilized crushed stone base.

Keywords: asphalt stabilized crushed stone, coarse aggregate, SSC, dynamic stabilization, high-temperature stabilization

THE RELATIVE SPECIALITIES

Summarization on Application of High Modulus Asphalt Concrete (HMAC) Xia Mingjiang(254)

Abstract: The article discusses the application of high modulus asphalt concrete. The high modulus asphalt concrete can reduce the deformation of pavement structure, delay the rut causing, improve the fatigue properties of pavement and lengthen the service life of pavement. At present, HMAC has been well-known in the foreign countries, and there have been the relevant standards, but it is just started in China. It should be further to study HMAC in order to form the complete set of technology in line with the national conditions of China.

Keywords: road engineering, high modulus, asphalt concrete, asphalt pavement, application

Application of Foam Light Soil Anti-floating Technology in Road Engineering Wan Shangwu(257)

Abstract: The foam light soil, as the soil roadbed of municipal road, is firstly used in Shanghai. The new anti-floating technology is not set forth in the current road construction standard. According to the road engineering case of Yangguang Road, the article sets forth the application of the anti-floating technology for the typhoon rainstorm events and the conventional road anti-floating technical preventive measures, and collects the practical construction experience so as to be referred for the construction of the similar projects.

Keywords: foam light soil, soil roadbed of road, anti-floating technology

Application of E-steel Damping Bearing in Continuous Girder Bridge Fan Zuoyin(260)

Abstract: E-steel damping bearing integrates E-steel damping element and bearing together, and it is appropriate for isolation bearings of continuous girder bridge. This article gives the result that the selection of E-steel damping bearing can withstand severe earthquakes by the anti-earthquake analysis of the continuous girder bridge of the main bridge (41+58+58+58+41) m of No.1 Bridge Project in Tianshui Economic Development Area (Shetang Industrial Park) in 8-degree earthquake area, and under the action of severe earthquake, the bridge pier is not into the plastic block by itself, just E-steel damping element of E-steel damping bearing has plastic energy dissipation.

Keywords: E-steel damping bearing, continuous girder bridge, isolation bearings

THE RELATIVE SPECIALITIES

Analysis on Scheme Comparison and Selection of Underground Diameter Line to Cross Jingang Bridge by Shield Method from Tianjin (W) Station to Tianjin Station Wang Xuesong, Guo You, Su Yanna(263)

Abstract: The article introduces the technical scheme of the underground diameter line to cross Jingang Bridge from the two east and west banks from Tianjin (W) Station to Tianjin Station, and calculates, analyzes and compares the schemes by the numerical simulation means, which provides the technical support for the optimization of the engineering technical scheme.

Keywords: underground diameter line, shield method, comparison and selection of scheme, Tianjin

Numerical Simulating Analysis on Impact of Undercut Electric Power Tunnel to Underpass Existing Subway on Subway and Soil Layer Deformation Ji Yonghong, Kang Jinlong, Yuanwei(269)

Abstract: This paper analyzes the impact of an undercut tunnel on the existing vehicle subway settlement and soil layer deformation. A practical project is modeled. The paper analyzes two construction steps of reducing the groundwater level and undercutting the electric power tunnel. The results show that the reduction of groundwater level will cause the greater settlements of vehicle lane and soil layer, but the undercutting process will result in a little impact on the settlement.

Keywords: undercut, underpass, settlement

Semi-empirical and Semi-theoretical Prediction Method of Surface Settlement Caused by DOT Tunneling Lu Hanxin(272)

Abstract: The article puts forward a semi-empirical and semi-theoretical calculation model considering the characteristics of DOT construction method to calculate the ground loss caused by DOT tunneling from the viewpoint of engineering practices. This mode uses peck method to calculate the surface settlement, and contrasts with the engineering measured data. The result shows that the relative error of the measured data and the model prediction can be controlled within the allowed limits of project.

Keywords: double-o-tunnel construction method, surface settlement, ground loss, prediction

Super-large-diameter Slurry Balance Shield to Cross Flood Control wall and Wharf Pile Foundation in Short Distance Fan Jie(275)

Abstract: The soil loss rate is large relatively to the metro shield in the construction because of its large section and strong slurry permeability when the super-large-diameter slurry shield crosses the buildings and structures. The construction risk is huge when it crosses the flood control wall or wharf pile foundation in short distance, which will affect the use of flood control wall and wharf and cause the greater economical loss and the bad social impact in an unguarded moment. The article studies and sums up the construction of Shanghai Changjiang Road (W) Crossing-river Tunnel to cross the flood control wall and wharf pile foundation of Puxi in short distance, and puts forward the issues for attention in the short-distance crossing process and the detail solving measures, which can be referred for the similar construction.

Keywords: super-large diameter, shield, short distance, crossing, pile foundation, Shanghai

Optimization and Application of Embedment Depth of Supporting Piles for Deep Foundation Pit of Subway Station Chen Jianshan(279)

Abstract: The embedment depth of the supporting piles for deep foundation pit is an important parameter in the design and construction of the foundation pit, and is also an important parameter to affect the stability of the foundation pit. So properly to increase the embedment depth of the piles can not only improve the overall stability of the pit, but also reduce the displacement of the supporting piles. But excessive depth will be inevitably not economic. According to the practice of a station, the paper adjusts and optimizes the embedment depth of the supporting piles for deep foundation pit by using the software of Lizheng. The results show that the pit is safe and reliable so as to reduce the cost and saves the time, which can be referred for the similar projects.

Keywords: foundation pit, supporting pile, embedment depth, optimization

Design on Overlarge Area of Deep Foundation Pit Adjacent to Several Rail Traffic Operation Lines Yang Hongwei(283)

Abstract: The foundation pit of Shanghai Railway Station North Square is an overlarge area of deep foundation pit project adjacent to several metro lines under operation, and its surrounding environmental protection is very high required. Aiming at the characteristics of irregular shape of this pit, complicated geological condition and limited construction period, the foundation pit is constructed by zones, and every zone is used of the different supporting structural design schemes. The result of implementation shows that this design can guarantee the smooth implementation of foundation pit, and also ensure the security of the surrounding metro lines under operation, which can be also referred for the similar projects in the future.

Keywords: deep foundation pit, overlarge area, design, Shanghai

Analysis of Foundation Pit Monitor for Zhujiang Road Station in Nanchang Metro Line 1 Wang Lie(288)

Abstract: Zhujiang Road Station in Nanchang Metro Line 1 is constructed by the enclosure of cast-in-site pile plus rotary jet grouting pile and the open excavation construction method. This station is located at the bad geology of Changbei Fenghuangzhou. The article introduces the scientific monitor of foundation pit to make the pit be constructed by the informatization and to guide the treatment of various dangers in order to guarantee the security of foundation pit.

Keywords: Nanchang, Metro Line 1, monitor of foundation pit, informatization construction

Analysis on Design Technology of Shenzhen Haiyuan Road (1st) Tunnel Chen Hongbin(290)

Abstract: With the rapid growth of urban economy and a high concentration of the population in China, the construction of urban tunnel and underground engineering is increasing. For the urban tunnels different from the general mountain tunnels, this article briefly introduces the study status of urban tunnel, and uses the characteristic curve method to analyze the reinforcement mechanism of tunnel surrounding rock in order to exactly and especially take the measures to improve the self-stability ability of tunnel surrounding rock, and to guarantee the structure safety and normal service. Combined with the engineering cases, this article analyzes the design concept, design method and durability measures of Shenzhen Haiyuan Road (1st) Tunnel, which can be referred for the similar projects.

Keywords: urban tunnel, reinforcement mechanism of surrounding rock, characteristic curve, durability measure, Shenzhen

Study on Scheme Comparison and Selection of Pipe Section of Tianjin Haihe River Immersed Tunnel

..... Xie Xin(294)

Abstract: Tianjin Central Avenue Haihe River Tunnel is the first tunnel constructed by the immersed tunneling method in the northern area. The article compares the advantages and disadvantages of the different pipe section schemes from the aspects of the pipe section plane shape, riverbed shape and channel requirement, freeboard height, hauling sinking, dry dock scale and pipe section join position. The result shows that the two-section pipe scheme has the advantage of the join quantity and freeboard height, and the three-section pipe scheme has the obvious advantage of immersed pipe floating hauling and the dry dock site selection. By the comprehensive comparison, the three-section pipe scheme is finally recommended as the engineering implementation scheme.

Keywords: Haihe River Tunnel, immersed tunnel, pipe section, scheme comparison and selection

Prevention and Control of Tunnel Fire Huang Yufeng (296)

Abstract: The fast development of social economy will bring the rapid change to the road traffic. In the meantime, the tunnel traffic is also quickly developed. With the large-scale construction of highway tunnel, the tunnel number, traffic flow and dangerous goods transport volume are all increased, the fire danger will present the upward trend in the highway tunnels, and the fire control and security issues of tunnel are also increasingly concerned by the people. In order to reduce the fire risk of tunnel, the article analyzes the characteristics, damages and causes of fire accidents of highway tunnel, and puts forward some proposals and measures to improve the security level of Dalian Road Tunnel so as to achieve the prevention aim of tunnel fire of "priority to prevention, combination to fire control".

Keywords: tunnel, fire, prevention measures, fire control system

Prospect for Application of Alloy Cable in Sewage Treatment Industry Liang Rongxin(299)

Abstract: According to the Comparison of various technical parameters of the new alloy cable and the traditional copper core cable and combined with the present situation of cable application in the water treatment industry, the article demonstrates the better prospect for the application of alloy cable in the water treatment industry representing the municipal infrastructure projects, and puts forward the design gist in its practical application.

Keywords: swage treatment, alloy cable, cable ampacity, external diameter of cable, flame retardant cable, application prospect

Elementary Analysis on Interface Management of Underground Station Decoration Project of Rail Traffic

..... Wei Bo, Shi Zhenghong(302)

Abstract: Taking the underground station decoration project of Rail Traffic Line 16 as an example, the article analyzes the interface of decoration engineering and various specialties, and according to the main engineering contents of decoration engineering, describes the construction interface relationship among the main materials and various system specialties in the decoration engineering, and puts forward the relative requirements of interface management, which can be referred for the underground station decoration engineering of rail traffic.

Keywords: rail traffic, underground station, decoration engineering

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通 知

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