

城市道桥与防洪



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主办：上海市政工程设计研究总院(集团)有限公司

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图为上海市市政工程建设发展有限公司
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园林博览会B区暨双鹤湖中央公园项目

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——《城市道桥与防洪》

● 本期看点

- 武汉市无障碍环境建设研究
- 城市地下立交设计施工关键技术
- 城市钢桥通用铺装技术方案研究
- 西蒲铁路立交雨水泵站及排水系统的升级改造

学术联盟：上海市城市科学研究会



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封面工程

本期封面工程为第十一届中国(郑州)国际园林博览会 B 区暨双鹤湖中央公园项目。上海市市政工程建设发展有限公司作为该项目的工程咨询单位,全面代表业主单位负责工程建设的进度、质量、安全文明施工、造价控制,依靠自身丰富的市政工程管理经验和高超的技术水准提供专业服务。

该项目位于郑州航空港区南部双鹤湖片区核心区,是第十一届园博会重要组成部分。该项目占地 165 hm²,投资约 40 亿元,以“科技生态”为主题,致力于建设一座“先于城市又融于城市”的中央公园,实现现代科技与生态文明的有机融合。

根据总体方案设计,园区内规划布置有地下汽车联络道、城市综合管廊、地下商业广场和地下公共停车库等地下服务设施及水系、桥梁、绿化景观等。其中地下车库联络道(12.4 m×6.6 m)主线全长 4.1 km,综合管廊(3.7 m×6.9 m)全长 6.1 km,地下商业面积 5.3 万 m²,地下车库 4.4 万 m²(停车位 1 319 个),水体面积 44.8 万 m²,桥梁 40 座,水闸 4 座,溢流坝 2 座,绿地面积 116.4 万 m²。

该项目于 2016 年 2 月 2 日开工,2017 年 7 月基本建成,9 月 29 日与园博园同时开园。

Urban Roads, Bridges & Flood Control

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ROADS & COMMUNICATION

Key Design and Construction Technologies of Urban Underground Interchange Xu Yanlin (1)

Abstract: Taking Dalian Southern Binhai Avenue East End Bridge Tunnel Project as an example, the article mainly introduces the structural style and plane forking structure of large urban underground interchange, and the key overall design and construction technologies of tunnel. The super large section and large section of this tunnel are connected with excavated box culvert, and the special structures of excavated box culvert and double-arch tunnel are rare in tunnel construction of China, which provides a useful reference for the other projects in China.

Keywords: underground interchange, long-span split tunnel, excavated box culvert, double-arch tunnel, super large section

Elementary Analysis on Overall Design of Urban Underground Road Cao Zhenbo (6)

Abstract: The types and features of underground road are analyzed. The design principles and methods of urban underground road are summarized. Based on the most constructed underground tunnels, the overall design points are elementarily analyzed from three aspects of road alignment, cross section and safety facilities. The horizontal and vertical curves of driving sight distance are required to check and calculate especially in the route design. The straight line length, and the tunnel entrance and exit should be concerned in the design.

Keywords: underground road, overall design, route alignment, road cross section, road safety

Design of Overall Expressway and Interchange Scheme in Qingyuan City Yao Huina, Wei Wending (9)

Abstract: According to the land planning and the practical engineering construction condition of the project, the article analyzes the traffic capacity and service level of this road section, and introduces the overall design of urban expressway, and the design gist of the interchange scheme for two main nodes of the intersecting node of Hucheng Avenue West and Guangzhou - Qingyuan Expressway, and the intersecting node of Hucheng Avenue West and Jianshe Road III, which can be referred for the design of the similar engineering projects.

Keywords: urban expressway, forecast of traffic volume, interchange, scheme design, overall

Bicycle System Planning in Dongtan Eco-City of Chongming District in Shanghai Peng Qingyan (14)

Abstract: Bicycle traffic is an important part in the low-carbon transport. The bicycle planning emphasis in the Dongtan Eco-City of Chongming District in Shanghai is the bicycle rental system and bicycle lane system. The article puts forward the total demand of rental bicycle, the calculation method of fitted-out bicycle, and the hierarchy system and division standard of bicycle rental points, plans the overall layout of rental points in Dongtan Starting Area, and introduces the different rental points of plane layout scheme. The operation mode is the Public-Private Partnership (PPP) mode cooperated by the enterprise and government. The bicycle lane network of Dongtan Eco-City is composed of two systems of routine road and slow special land. The article defines the minimum bicycle lane widths of the different roads, and introduces the different roads of cross section design and road layout planning, and finally evaluates the reachability of bicycle rental point and the density of bicycle land in Dongtan.

Keywords: bicycle traffic, bicycle rental point, hierarchical division system, PPP mode, slow special land, cross section design

Design of Street Reconstruction Based on Traffic Calming Xu Li (17)

Abstract: In the present city of increasing sharply the traffic demand of motored vehicle and unbalancing seriously the traffic supply and the traffic demand, the reviving movement from road to street is rising now. Not only the planning designers, but also the managers have a better understanding of "street" and "road". The article analyzes the problems existing in the design layout of modern urban road, discusses the different road design keynotes, introduces the elicitation from the street movement and the traffic calming design, and summarizes the characteristics and application scope of calming design. Taking the Shanghai Daning Road Street Landscape Planning Project as an example, the article introduces the application of traffic calming in this project.

Keywords: road, street reconstruction, traffic calming

Research of Traffic Organization for Lingang Avenue - Dadong Interchange Node Cao Ni (21)

Abstract: Lingang Avenue as the main communication channel between Lingang New Town and Shanghai City is an important component of the radial road of Lingang New Town. Dadong Interchange is an important node in the Nanhui Section of G1501 Expressway, and is as the traffic transform node of G1501 Expressway and Daye - Dongda Highway. According to the planning of Lingang Area, the east side of Dadong Interchange is required to connect into the road and Dongda Highway is adjusted as Lingang Avenue. At the same time, Lemahe River Bridge is demolished. These will cause a certain influence on the travelling of motored vehicle and non-motored vehicle in this area. Aiming at this problem, the article introduces the scheme design from the aspects of adding the linking taxiway of intersection, perfecting the bus system, and organizing the slow traffic system and guiding the traffic of surrounding road network, which reduces the influence of project implementation on the travelling of pedestrian and vehicle in this area, and can be referred for the traffic organization scheme of the similar urban interchange nodes.

Keywords: Linggang Avenue, Dadong Interchange, node design, traffic organization

Study on Temporary Traffic Organization in Road Reconstruction Jiang Kaifeng (25)

Abstract: To analyze the impact of temporary traffic organization on the road reconstruction, the different temporary traffic organization schemes are studied, and its impact on the construction efficiency, cost and regular operation are analyzed by the detailed projects. The study results show that the different temporary traffic organization schemes have the different impacts on the construction and regular traffic operation. It should be to pay more attention to the comparisons of temporary traffic organization schemes in the design of construction organization, and to fully consider many factors of construction efficiency for the selection of the optimized scheme.

Keywords: temporary traffic organization, road reconstruction, scheme comparison

Reconstruction Scheme of Station Square in Enshi Railway Station Cui Sai (28)

Abstract: Aiming at the problems of defective surrounding road system, incompletely supported parking lot, disordering traffic organization, and poor landscape of railway station as the gateway image of city, the square and urban road underground spaces are utilized under the condition of limited land. The optimization of traffic organization and construction organization scheme can solve a series of the detailed problems in Enshi Railway Station.

Keywords: railway station, station square, underground space, reconstruction

Integration of "Green Highway" Idea into Highway Engineering Feasibility Study Stage

..... Zhang Liangchen, Deng Lijuan, Dang Gaofeng (32)

Abstract: The implementation of green highway construction is the important measures to carry out five development concepts, to implement the four-traffic development requirements and to practice the development strategy of ecological civilization construction, and is the necessary selection to realize the restructuring development of industry. Taking the relevant standard and guideline of "green highway" as the basis, the article discusses the important role of feasibility study stage in the promotion of "green highway" construction process, and how to take the green environmental protection measures, and provides the guiding proposal for the integration of green ecological idea into highway construction from the source.

Keywords: green highway, highway engineering, feasibility study

Analysis on Influence of Road Condition on Driving Safety Gao Jianwei(34)

Abstract: The road geometric alignment, pavement quality and traffic supporting facilities are the main factors influencing the driving safety road, in which the geometric alignment of road is especially important. This paper summarizes the influence mechanism of these factors on the driving safety in detail, and proposes the relevant design countermeasures so as to improve the road design quality and ensure the driving safety.

Keywords: road condition, geometric alignment, subgrade, pavement, driving safety, influence analysis

Existing Problems and Improvement Proposal of Urban Road Design ... Yu Kefeng, Zhao Shuli, Zou Qingwen (37)

Abstract: The existing problems of urban road design are summarized and discussed. The principles and methods to design the modernized urban road are then put forward. Finally, several improvement proposals including the road route planning from the whole situation, improving the greening and landscape of road design, and integrating the municipal facilities of water supply, drainage and electrical pipelines into road design are put forward so as to improve the design quality of urban road under the background of urbanization development in China.

Keywords: urban road, design, people oriented, landscape, existing problem, improvement proposal

Study on Treatment Method of Dredger Fill Subgrade on Haihua Island Ai Chunbin, Zhang Min (40)

Abstract: Based on Hainan Province Danzhou City Haihua Island Municipal Road Project, the article proposes a set of economical and effective subgrade treatment scheme for the dredger fill subgrade of Haihua Island. According to the different requirements and the difference of dredger fill quality of the general roads within the island and the road section behind the bridge, the whole subgrade treatment scheme of Haihua Island combines three methods of cement mixing pile composite foundation, dynamic consolidation method and equal load preloading + cement mixing pile. The treatment effects of subgrade show that the treated subgrade achieves the specification requirements, and also saves the construction cost. This subgrade treatment scheme can be referred for the similar dredger fill island projects.

Keywords: soft subgrade, subgrade treatment, cement mixing pile, dynamic compaction method

Elementary Analysis on Subgrade Treatment along River of West New Line in Lanzhou Liu Jing (44)

Abstract: With the continuous expansion of city construction range, the road construction will be faced with a great deal of subgrade treatment work. The restricting factors of construction are more because of Lanzhou City built closely to the river. The time consumption of subgrade treatment work is long and its investment is large. The seeking of more economic and safe subgrade treatment method and measures increasingly becomes the gist of engineering construction. Combined with the engineering cases, and on the basis of comparing the subgrade treatment schemes, the combined method of riprap and displacement method with the dynamic compaction is used. Under the premise of ensuring the engineering safety, this scheme will greatly save the engineering investment. The largest characteristic of this scheme is the construction technology simple and fast, which can accumulate the experience for the treatment of flood lands in Lanzhou City.

Keywords: riprap and displacement, dynamic compaction, subgrade treatment

Cause Analysis and Preventive Measures for White and Black Reflection Cracks of Cement Concrete Pavement ...

..... Cheng Sisheng (48)

Abstract: The article analyzes the white and black reflection cracks of cement concrete pavement. Based on the cause and mechanism of crack, the targeted prevention measures are proposed. The article puts forward the solving method and the engineering construction gist of the reflective crack by the engineering case of

Quanxin Road in Xuzhou City. According to this method to construct, the roads are operated well.

Keywords: urban road, cement concrete pavement, asphalt overlaying, reflection crack, cause analysis, preventive measures, anti-cracking paste, stress absorbing layer

Analysis on Disease Cause of Tunnel Concrete Pavement and Its Overhaul Design Tan Saijie (51)

Abstract: According to the practical condition of tunnel concrete pavement of an expressway, the field survey finds the diseases of insufficient anti-slide performance existing in this tunnel pavement and the pavement cracking. The article completely analyzes the causes of these two diseases, and on this basis, puts forward the overhaul design scheme of this tunnel pavement in order to provide the reference for the similar projects.

Keywords: tunnel, concrete pavement, anti-slide performance, cracking

BRIDGES & STRUCTURES

Brief Introduction on Check Computation of Pre-stressed Concrete Simply-supported Continuous T-beam Bridge Structure Guo Fenggang (54)

Abstract: The pre-stressed concrete simply-supported continuous T-beam bridge is a widely used structure form currently because of its advantage combining the simply-supported beam and continuous beam. With the increment of operating time and the increase of traffic flow, the bearing capacity of more and more bridges in service gradually declines, which makes the normal operation of bridge have a potential safety hazard. Relying on the field detection and load test of a pre-stressed concrete simply-supported continuous T-beam bridge, the finite element software of Midas/Civil 2012 is used to establish the finite element model of finished bridge in order to evaluate the practical technological situation and bearing capacity of bridge, which has the important meaning to strengthen the quality control of bridge.

Keywords: pre-stressed concrete simply-supported continuous T-beam bridge, inspection of appearance, technological situation, load test

Structural Design of Covered Bridge in Fengxian County of Shaanxi

..... Li Xusheng, Zhang Yujie, Mou Sanshan, Liu Binbin (58)

Abstract: The covered bridge in Fengxian County of Shaanxi as an integrated covered bridge of landscape and commerciality has the characteristics of large upper construction concentrated load, high load intensity and good landscape. The grillage analogy method is used to analyze the upper structure of bridge by the software of Midas Civil. The calculation shows that the use of nonstandard span combination (30 m+25 m+25 m+30 m=110 m), nonstandard beam height (supporting beam height 2.8 m), and various checking calculation indexes of serviceability limit state and ultimate limit state of upper bridge structure all satisfy the standard requirements aiming at the larger load. The good operation state of this covered bridge after completion can prove that the grillage analogy method can be better applied in the analysis of the complicated box beam structure.

Keywords: covered bridge, grillage analogy method, structural analysis

Study on Reinforcement Method and Reinforcement Effect Evaluation of Rigid Frame Arch Bridge Based on Finite Element Analysis Lang Danni (61)

Abstract: Combined with the practical engineering characteristics and aiming at the different diseases, the relevant reinforcement measures are selected. With the help of the software platform of Midas/Civil, the finite element analysis model is established on the engineering cases to carry out the theoretical reinforcement calculation of rigid frame arch bridge. The article compares and analyzes the parameters of deflection, strain and bearing capacity before and after reinforcement through the dynamic and static load tests. The result shows that the reinforcement scheme is reasonable and feasible, and the reinforcement effect is good.

Keywords: rigid frame arch bridge, reinforcement measures, finite element analysis, effect evaluation

Study on Design of Cable Pylon Anchorage Zone for Bridge Wu Pu (66)

Abstract: The arched cable pylon cable-stayed bridge has some superiority in the higher landscape requirement of bridge bid because of its appealing design, downy line and simple graceful advantages. At present, there is a little study on this kind of cable-stayed pylon in China. Its space plane system and curved pylon structure make the stress of the whole cable pylon anchorage zone more complex. Taking a single-eyebrow arched pylon cable-stayed bridge an engineering case, the article analyze the stress condition of cable pylon anchorage zone of arched cable-stayed pylon in detail, which can be referred for the design of the similar cable-stayed bridges.

Keywords: arched cable-stayed pylon, cable pylon anchorage zone, pre-stressing anchorage

Study on Application of Steel Fiber RPC in Orthotropic Steel Deck Pavement Yuan Jianglin (71)

Abstract: The orthotropic deck slab is widely used in the modern bridge engineering. Due its crisscross vertical and horizontal ribs, and the insufficient stiffness of steel roof, it is easy to cause the stress concentration and the fatigue cracking problem is serious under the partial wheel load stress. According to the idea of composite beam, a coating of RPC with various excellent mechanical properties is paved on the top of orthotropic deck roof. The roof stiffness is enhanced through the combined action of RPC and steel roof so as to decrease the fatigue cracking phenomenon caused by partial stress concentration. Taking the orthotropic bridge deck slab of Sutong Bridge as the study object, the article compares and studies the stress amplitudes at three common fatigue wearing positions. The study results show that the whole stiffness of orthotropic bridge deck RPC and roof is increased significantly after the use of the new RPC composite pavement, and the partial stress concentration is reduced. The new RPC composite pavement layer can obviously reduce the fatigue stress amplitude of the detailed parts.

Keywords: RPC, orthotropic bridge deck slab, pavement, epoxy asphalt concrete

Application of Friction Pendulum Seismic Isolation Support in Municipal Bridge

..... Yu Zengming, Zheng Mingwan (75)

Abstract: The article briefly introduces several common seismic isolation supports now, and sets forth the

advantages, characteristics and working principle of friction pendulum seismic isolation support. According to the seismic analysis and calculation of a municipal bridge, the article discusses and analyzes the seismic isolation performance of this support.

Keywords: friction pendulum, municipal bridge, seismic isolation, anti-seismic, support

Study on Application of BIM Technology in Bridge Design Wang Jiwen, Xia Feng (78)

Abstract: The article analyzes the technology advantages and application features of BIM, and summarizes the basic characteristics and difficulties of bridge design in detail so as to make clearly the application of BIM technology to improve and optimize the bridge design. The article summarizes the application of BIM in the bridge design from two stages of feasibility and construction drawing, which highlights the life-cycle management concept of BIM.

Keywords: BIM, bridge design, life-cycle, application study

Innovative Application of Steel Pipe Pile He Jun (81)

Abstract: Due to its high strength, convenient fabrication, able to weld and cut into any lengths, convenient setting and multiple turnover use, the steel pipe pile has been applied widely in the foundation work, foundation pit work, large water (offshore) operating platform and supporting work. In Zhaoqing New District of Guangdong, the steel pipe pile is used innovatively and the steel pipe pile bridge abutment is designed for the steel temporary bridge built for the construction of a cable-stayed bridge in order to realize the quick, green and lower cost construction of the steel temporary bridge, which can be referred for the similar projects.

Keywords: steel pipe pile, innovation, application

FLOOD CONTROL & DRAINAGE

Upgrading and Reconstruction of Rainwater Pumping Station and Drainage System of Xipu Railway Interchange Zhong Zhipeng (84)

Abstract: Xipu Railway Interchange Rainwater Pumping Station built in 1989 is responsible for the rainwater pumping task in the partial road section of Yongdingmen Dongbinhe Road under the railway bridge. According to the analysis on the present cause of waterlogging in Xipu Railway Interchange, the article summarizes the technical characteristics of upgrading and reconstructing the rainwater pumping station and drainage system of the concave-down interchange, and puts forward the relevant issues for attention in the design operation. As the first batch of concave-down interchange drainage system to be upgraded and reconstructed in the central urban area of Beijing, the low-water collection system and pumping station of interchange are upgraded and reconstructed in the design, and meanwhile the new storage tank is constructed for peak storage so as to improve the design return period of treatment capacity of the whole drainage system from $P=2$ a to $P=10$ a.

Keywords: rainwater pumping station, concave-down interchange, storage tank, return period, upgrading and reconstruction

Comprehensive Comparison and Analysis of Sludge Single-drying Incineration and Sludge Mixed Burning in Power Plant Chen Ruchao (88)

Abstract: The objective of sludge treatment and disposal is the Reduction, stabilization, harmless and resource in China. The article comprehensively compares and analyzes the sludge single-drying incineration technology and the sludge power-plant mixed burning technology from the total disposal of sludge, the coal transport of power plant boiler, the safe operation of power plant boiler, the discharge standard of exhaust gas and the utilization of fly ash, which can be referred for the design and operation of the similar sludge disposal projects.

Keywords: sludge, drying incineration, power plant, mixed burning

MANAGEMENT & CONSTRUCTION

Application of Single-wall Steel Cofferdam in Reinforcement of Bridge Pile Foundation in Spring Tide Range

..... Hu Yuyong, Gao Wenbo, Ma Chao (90)

Abstract: The spalling concrete, and the exposed and rusted steel bar of bridge pile foundation in water caused by the day-by-day scour of river water and sea water will lead to the hole shrinkage of pile foundation, which greatly threatens the safety of bridge structure. It is required to maintain and reinforce the pile foundation. According to *Study on Construction Technology of Steel Cofferdam for Bridge Pile Foundation in Spring Tide Range* (S20130013) and the case of Wenzhou City Dongou Bridge Pile Foundation Reinforcement Project, the article introduces the application of single-wall steel cofferdam in the treatment of quality problems of damaged and exposed-bar pile foundation in water, and sets forth several key technologies for attention in the implementation and construction of steel cofferdam reinforcing pile foundation construction scheme.

Keywords: bridge, reinforcement of pile foundation, single-wall steel cofferdam, spring tide range

Calculation and Analysis on Construction Operation of 220-t Truck Crane to Lift Concrete Deck

..... Deng Deyuan, Huang Min, Wu Youming (94)

Abstract: The hoisting of cross-shaped spiral sculpture over the concrete continuous box girder bridge is required to use 220-t truck crane to lift the deck. The construction load is larger. It is required to calculate and check the bridge structure. According to the simulation travel and hoisting status to achieve the relative operation parameters, and after the calculation of internal force and the recheck of reinforcement under the multi-working conditions, the result shows that the scheme is safe and feasible. The use of the cross-shaped mode to distribute the beam distributes the load of single landing leg to four subgrade boxes. The sand is paved under the subgrade box, which can solve the problem of overlarge partial load. The relative experience can be referred for the similar projects.

Keywords: truck crane, bridge structure, structure recheck

Key Construction Technology of Central Plane Ultra-wide Front-pivot Form Traveler Gong Bingchuan (97)

Abstract: According to the strict control in the detailed design and construction of the front-pivot form traveler for the cantilever section of main girder for cable-stayed bridge, the article introduces the application of front-pivot form traveler in the construction of space plane cable-stayed bridge, the solving method of key technical problems and the other technical details in the construction of front-pivot form traveler in detail. The relative experience can be referred for the similar projects.

Keywords: cable-stayed bridge, ultra-wide box girder, space plane, front-pivot form traveler

Construction Technology of Cast-in-situ Full Framing in Bridge Engineering Zhang Zhanyu (99)

Abstract: The cast-in-situ full framing construction method is the most common construction method in the bridge engineering construction process. At the same time, the full framing construction is also the foundation link in the cast-in-situ box beam process. The framing strength, rigidity, stability and base bearing capacity will directly influence the engineering construction quality. Taking a practical project as an example, the article analyzes the construction method of cast-in-situ full framing. The framing pre-compaction test is carried out after the construction in order to ensure the construction quality of full framing.

Keywords: cast-in-situ full framing, vertical rod gasket laying, ballasting test

Study and Application of Steel Anchor Box Elevated Installation Technology of Overweight Cable-stayed Bridge Xie Jianhui (102)

Abstract: Aiming at the characteristics of large lifting tonnage, big lifting height and high accuracy requirement of steel anchor box of a waterway bridge in North Street, the article studies and summarizes the elevated hoisting technology of large-tonnage steel anchor box including the hoisting frame design and construction of steel anchor box, the installation accuracy control of steel anchor box, and the connection control of steel anchor box and cable pylon concrete. This installation technology ensures the installation accuracy of steel anchor box, and can produce the good economic benefit and social benefit.

Keywords: steel anchor box, elevated installation, anchorage system

Study on Safety Management of Large Volume (High-pier Long-span) Cast-in-situ Continuous Box Girder Support System Ding Jianfang (105)

Abstract: The support collapse accident is a common accident in the construction process of large volume cast-in-situ continuous box girder support. The article firstly analyzes the cause of collapse accident of formwork support, and then analyzes the safety management measures for the scaffold support system so as to guarantee the construction safety of cast-in-situ continuous box girder support system.

Keywords: cast-in-situ continuous box girder, support design, scaffold management

Construction Technology to Replace Short Angle Steel Support Li Weiping, Zhang Haibo (108)

Abstract: With the rapid development of city construction, the deep foundation pit engineering is more and more

general. The support demolition in the engineering construction process of inner-supported deep foundation pit widely exists in a construction process. The support replacing technology is used to solve the stability problem of support caused by the demolition of inner support so as to make the support of foundation pit rebuild the balance under the new condition. At present, the short angle steel support as the support replacement is started to use in more and more projects of deep foundation pit. The practice has proved that the short angle steel support as the support replacement method is simple, convenient and efficient. Its effective effect is obvious. There is a good applicability in the projects.

Keywords: short angle steel support, support replacement, deep foundation pit

Elementary Discussion on Prefabricated Part First-hanging Construction of Landscape Bridge Zhao Jianqin (110)

Abstract: Combined with the engineering cases, the article introduces the prefabricated part first-hanging technology used for the fabrication, installation, supporting and maintenance of landscape bridge, which overcomes and solves many problems in the process. According to the comparison with the traditional technology, the first-hanging construction embodies the superiority in the Dongtan Area of Chongming, which can be referred for the construction technology and quality acceptance of the similar projects.

Keywords: integrality, processing and installation accuracy, supporting system

Application of AM Piles in Underground Department Store Project of Piazza Shen Jin (114)

Abstract: The AM piles are used as the foundation of the main structure in the underground department store project of piazza. The construction process can be visually controllable, and the quality of finished pile is easy to control. It has the good technical, economic and social benefits. This paper focuses on introduction of the main construction technologies of AM pile different from the common cast-in-situ pile, such as drilling hole, expanding hole, preparing artificial stabilizing fluid and cleaning hole, which can be referred for the similar projects.

Keywords: AM pile, visual controllability, drilling hole, application

Reconstruction Project of W3 Upper Ramp in Nanpu Bridge Qian Guohui (117)

Abstract: The W3 Upper Ramp of Nanpu Bridge is located in the busy traffic area of the Bund. The reconstruction project must take account of the social impact. The reconstruction scheme is the implementation of local removal and the utilization of original structures. The measures are taken to ensure the low impact on the subway and the low impact on the social transport in the project. And combined with the beam removal and the precast assembly technology, it is to ensure the recovery of traffic within 60 days.

Keywords: reconstruction project, local removal, jacking beam, precast assembly, low-impact replacement

Analysis on Cause and Study on Preventive Measures of Structural Concrete Cracks of Utility Tunnel
..... Wang Zhanguo (120)

Abstract: The cast-in-situ concrete of utility tunnel is easy to cause some cracks, in which some cracks will have a negative impact on the safety and durability of structure. It must be to take the efficient measures to

prevent it. Combined with the cracks existing in the construction of utility tunnel, the article firstly analyzes the crack causes, and then introduces the relative measures by these causes to prevent the crack cause, which can be referred for the design and construction.

Keywords: utility tunnel, cast-in-situ, crack

Disturbance Control of Pipe Jacking In Complicated Environment ... Fang Hao, Xu Weizhong, Zhang Ruiju (124)

Abstract: Pipe jacking construction as a trenchless construction method can solve the difficulties of the underground passage construction to destroy the surrounding buildings and to jam the road traffic. The article mainly analyzes the adverse impact of pipe jacking construction on the surrounding environment in the complicated environment, and puts forward the relevant control measures for the construction disturbance. Relying on the Huaian Tramcar Shenzhen Road Station Pipe Jacking Underpassing Project, the monitoring results of underground passage enclosing structure and surrounding environment show that various monitoring values are all less than the monitoring prewarning value, and show that the pipe jacking construction disturbance control technology is effective.

Keywords: pipe jacking, surrounding environment, disturbance control, monitoring, efficiency

Analysis on Roadbed Quality Control of Highway Bridge Engineering Shi Lei (129)

Abstract: The roadbed construction quality control of highway bridge engineering is a critical component in the highway bridge construction process, and has the important meaning to upgrade the operation stability of highway bridges. Taking the roadbed construction development of present highway bridge engineering as the basis and according to the working experience in the recent years, the article sets forth the detailed roadbed quality control mode of highway bridge engineering. The relative experience can be referred for the similar projects.

Keywords: highway bridge, engineering construction, roadbed, quality control

Study on Preventive Maintenance of Highway Bridge Wang Tao (131)

Abstract: With the rapid development of social economy and the increasing improvement of the people's life in China, the vehicle flowrate is more and more increased and the load of highway bridge is also increasingly large, which influence the long-term safe use of bridge. Therefore, it is imperative to strengthen the preventive maintenance of highway bridge. The article mainly discusses the necessary, level determination, time determination and implementation of preventive maintenance for highway bridge. This study has the important practical significance, and can be referred for the maintenance of the similar bridges.

Keywords: highway bridge, preventive, maintenance

Analysis on Application of Test Detecting Technique in Highway Construction Tao Jun (134)

Abstract: The test detecting work of highway is a key technique of quality control and completion acceptance of highway engineering construction. The reasonable application of test detecting technique can not only guarantee the highway construction quality, but also indirectly improve and optimize the highway construction

effect. The article analyzes the problems existing in the application of test detecting technique in the highway construction, and puts forward the measures to improve the application value of test detecting technique in highway construction.

Keywords: highway construction, test detecting technique, application

Widening Design and Construction Technology of Highway Soft Soil Roadbed Liu Zhongming (136)

Abstract: The main widening types and features of highway are summarized. The spliced widening method is generally selected under the condition of limited land. The critical issue of highway widening is analyzed, especially the influence of soft soil foundation on the widening. The main difficulty is the uneven settlement at the connection of the old and new roadbeds. The design and construction techniques of soft soil roadbed widening are proposed including the design of widening type, the reinforcing disposal of soft soil foundation and the construction at the connection of old and new roadbeds in order to guarantee the design and construction qualities of highway widening, and ensure the operation safety and the long-term using performance.

Keywords: highway, soft soil roadbed, widening, design method, construction technique

Application of Impacted Road Roller in Subgrade Construction Zhang Changgui (139)

Abstract: The subgrade compaction is more difficult in the subgrade construction, especially if the construction period of high-fill subgrade is limited and the natural settlement time of finished subgrade is insufficient. But the existing static roller and vibrating road roller cannot objectively efficiently solve the uneven deformation of high-fill subgrade in the construction, and is easy to cause many diseases of pavement cracking, collapsing, sinking, deforming and frost boiling. The main method to improve the compaction density of subgrade at home and abroad now is to use the impacted road roller for the compaction construction. The article mainly discusses the construction technology of impacted road roller.

Keywords: highway subgrade, impacted road roller, construction application

Discussion on Construction Technology and Quality Control of Cement Stabilized Macadam Base - Luo Xiang (142)

Abstract: The cement stabilized base of subgrade has the great application value, and can make the highway quality guaranteed. The quality control method of subgrade cement stabilized macadam base is required to comprehensively consider many reasons. According to the analysis and discussion on the characteristics, construction technology and construction quality control measures of cement stabilized macadam base, the article summarizes that only strictly to organize the construction, to inspect the quality of every stage and to pay attention to various requirement, the relevant problems can be avoided, and the integrated construction quality of project can improved.

Keywords: cement stabilized macadam base of subgrade, construction technology, quality control

Discussion on Application of Asphalt Pavement Construction Quality Dynamic Control Technology
..... Ji Xunshou (145)

Abstract: The highway development of China is the important guarantee to improve the economic level of the residents. At present, the highway pavement of China is mainly composed of asphalt. With the development of economy and the improvement of the people's living level in China, the sustained increment of private car ownership greatly increases the pressure to the asphalt pavement, and then causes the certain damage to the pavement. In order to improve the bearing capacity of asphalt pavement, it is necessary to carry out the technical study of the construction quality control of asphalt pavement. Combined with the working experience for many years, the article discusses the type and application of asphalt pavement construction quality dynamic control technology. The effective construction quality control of highway asphalt pavement should be taken action practicably. The new technology should be further used to create the farther development space of highway construction.

Keywords: asphalt pavement, construction quality, dynamic control technology

Discussion of Expressway Asphalt Pavement Disease Treatment Technology Zhu Haiqing (148)

Abstract: The expressway asphalt pavement often undergoes the different degrees of disease because of exposing to the weather after put into service, which will cause the influence on the traffic state of expressway. The article analyzes and studies the common disease cause, type, treatment technology and preventive proposal of expressway asphalt pavement, and puts forward the preventive measures to help the reduction of the early damage of asphalt pavement, better to improve the asphalt pavement quality and to guarantee the smooth road traffic.

Keywords: expressway, asphalt pavement, influence factor, treatment technology

Discussion on Crack Repair Construction Technology of Cement Concrete Pavement Wei Yabin (151)

Abstract: The cement concrete pavement has the advantages of high strength, good stability, good durability, a few maintenance cost and high economic benefit. But it is very necessary to discuss the repair construction technology of cement concrete pavement crack because of more common crack problems of cement concrete pavement. The article analyzes and discusses the damage causes, types, repairing status and crack repair construction technology of cement concrete pavement, which can be referred for the similar projects.

Keywords: concrete pavement, damage cause, crack repair technology

Discussion on Study of Highway Maintenance Machinery Allocation Wu Shuhe (154)

Abstract: The highway is the constituent part of the transportation infrastructure, and plays a decisive role in the national economic construction and the people's life. At the same time, the rapid development of highway transportation has put forward the high requirement for the highway maintenance. The article analyzes and discusses the existing problems, influence factors, principle and contents of highway maintenance machinery allocation. It stands from present and looks forward to the future. The professional maintenance and mechanical maintenance are the development direction of highway maintenance.

Keywords: highway mechanization, maintenance, machinery allocation, technical application

Analysis on Construction Gist of CRD Method Crossing Silty-fine Sandstone Tunnel Liu Xuewen (157)

Abstract: The center cross-diaphragm (CRD) method is a common construction method in the weak stratum construction of tunnel. The utilization of CRD method to construct can effectively prevent the sinking and deformation of supporting structure, prevent the horizontal displacement of soil body and reduce the ground settlement. Taking Majiapo Tunnel as an example, the article analyzes the engineering geological situation of tunnel. According to the study, it is designed to use the CRD method for the excavation construction of tunnel. The article discusses the construction technology of CRD method, which can be referred for the construction of the similar tunnel projects.

Keywords: CRD method, crossing silty-fine sandstone, tunnel, advanced small catheter

Standardizing Construction Management of Expressway Lin Chun (160)

Abstract: The use of standardizing construction management can ensure to achieve the great effects in the quality, safety and schedule of expressway construction management. Combined with the standardizing construction management practice of T-beam precast yard in Contract Section 18 of civil engineering of Liuwei Expressway, the article sets forth the relative contents of expressway standardizing construction management.

Keywords: expressway, T-beam precast, standardizing, yard construction, safety

STUDY ON SCIENCE & TECHNOLOGY

Study on General Paving Technology Scheme of Steel Urban Bridge

..... Zheng Xiaoguang, Ma Biao, Zhang Qian, Chen Yajie (162)

Abstract: Aiming at three characteristics of more positions, wide places and a few number of steel urban bridge, the article puts forward the general paving technology scheme of steel urban bridge, introduces the durable waterproof bonding system including the epoxy mica anticorrosive coating, the large dose no solvent of epoxy resin waterproof layer and the hot melt particle bonding material. The paving construction using the fine-granule dense high-viscosity asphalt mixture can guarantee the watertight feature, flexibility, high-temperature stability and anti-skid performance, and is beneficial to the following maintenance and repair. A series of property test is carried out including the material pull-out test, stretching test, attendant test, and paving system shear, pull-out and fatigue tests. The test results show that this paving system has the better pavement performance and durability.

Keywords: urban bridge, steel deck paving, hot melt particle, general scheme, chemical bonding

Development of Rapid Curing Agent for Soft Soil in Hexi Region of Nanjing

..... Sheng Zheng, Zhong Da, Teng Shiming (166)

Abstract: The rapid treatment of soft soil subgrade is the effective measures for shortening the road construction period and ensuring the construction quality. Combined with the flood land soft soil of Changjiang River in Hexi Region of Nanjing, the article introduces the development of a high-efficient economic soft soil curing agent. The main curing material is the cement, and the auxiliary curing materials are

the carbide slag, gypsum, triethanolamine, sodium hydroxide and polypropylene fiber for selection. The mixing ratio design is used to carry out the curing tests of the soft soil in Hexi Region of Nanjing. The strength characteristic of stabilized soil is determined through the unconfined compressive strength test. The final mixing ratio of rapid curing agent is 9% cement, 4% carbide slag, 2% gypsum and 2% sodium hydroxide.

Keywords: soft soil, rapid curing, unconfined compressive strength, optimum mixing ratio

Study on Construction of Accessibility Environment in Wuhan - Tao Ling, Che Libin, Huang Jun, Wang Feng (171)

Abstract: On the basis of building "accessibility construction city" in Wuhan, the article summarizes the construction situation of accessibility environment in recent years, analyzes the problems existing in the accessibility environment construction of Wuhan, and puts forward the countermeasures and proposals to construct the accessibility environment of Wuhan in order to further strengthen and improve the construction of accessibility environment, and to build the more travelable and more livable civilized city for the deformity and the aged.

Keywords: construction of accessibility environment, accessibility facilities, construction study

Study on Engineering Test of Post-grouting Cast-in-place Pile to Treat Soft Subgrade

..... Wang Xin, Zhang Qiang (174)

Abstract: According to the practical engineering site test, the article compares and analyzes the distribution conditions of single-pile bearing capacity, pile-end resistance and pile-side resistance of the post-grouting cast-in-place pile and the common cast-in-place pile. The result shows that the upper pile-side frictional resistance of post-grouting cast-in-place pile is easy to fully play, and the bearing capacity of soft soil subgrade is more obviously improved, which can be widely used in the treatment of soft soil subgrade.

Keywords: post-grouting cast-in-place pile, common cast-in-place pile, bearing capacity of pile foundation, pile-side resistance

Study on Lateral Thrust Test of Metal Urban Pedestrian Overpass Guardrail under Service - - - Ren Xudong (178)

Abstract: The lateral horizontal resistance test of guardrail is a method for the quality detection of urban pedestrian overpass guardrail. The article introduces the lateral thrust test of urban pedestrian overpass guardrail by a practical case, and describes the detection and assessment criterion of urban pedestrian overpass guardrail under service.

Keywords: overpass guardrail, lateral thrust, displacement, strain

THE RELATIVE SPECIALITIES

Wave Phase Identification of Geological Radar Detection Target Body

..... Wang Xingzhou, Guan Changlu, Wang Dawei (180)

Abstract: At present, the geological radar detection technology has been widely used in every industry. In order to achieve the detection result of geological radar, it is required to process and identify the radar records.

The phase identification of radar records is required to have the solid theoretical basis and the rich practical experience, and to comprehensively analyze the features of the reflective wave amplitude, phase, frequency spectrum and cophasal axes form of target body. The article introduces the detection tunnel of geological radar, wave phase feature of typical pavement target body and the identification analysis method by the engineering practices.

Keywords: geological radar, detection, wave phase, identification

Elementary Analysis on Value-added Management of Municipal Road Construction Engineering Project
..... Jin Lei (183)

Abstract: In recent years, with the advancement of urbanization process in China, the municipal road construction engineering projects have the new look not only in the number, but also in the quality requirement. In order to realize the sustainable development of enterprises, it must be to pay more attention to the role of value-added management in the municipal road construction engineering projects. The article firstly sets forth some problems existing in the municipal road construction engineering projects and the concept of value-added management, and then mainly analyzes the detailed methods and measures for the value-added management in the municipal road construction engineering projects.

Keywords: municipal construction, value-added management, cost accounting

Analysis and Control Measures for Influence Factors on Municipal Road Engineering Construction Cost
..... Cheng Haixia (185)

Abstract: Along with the rapid development of urbanization process in China, the municipal road as the important infrastructure of city becomes the important difficulty of ensuring its construction quality and also controlling its engineering construction cost. This paper analyzes the main influence factors on the municipal road engineering construction cost including the market condition, construction scheme, construction quality, construction management and construction period. Based on these influence characteristics, this paper puts forward the control countermeasures for the municipal road engineering construction cost separately from the engineering pre-construction period and the medium engineering construction period.

Keywords: urban road, engineering construction cost, influence factors, control countermeasures

Discussion on Problems Existing in Settlement of Municipal BT Project and Solving Strategy of Investor
..... Zheng Jie (188)

Abstract: As a new mode utilizing the non-governmental capital to invest the infrastructure project, BT project can efficiently ease the contradiction between the investment demand of urban infrastructure construction and the shortage of government funds. But the problems of management and mechanism still exist in the detailed implementation because of the shorter time of this mode operation and a little accumulation of the relative experience. Aiming at the practical work, the article briefly describes and thinks deeply some problems existing in the settlement of municipal BT projects and the solving methods of investor, which can be referred for the settlement of BT projects.

Keywords: investor, municipal, BT project, settlement, construction cost, examination

Evaluation of Design Rationality of Maluanshan Tunnel Based on Survey of Large-section Tunnels at Home and Abroad Liu Jingjing (191)

Abstract: Based on the statistical analysis of section type, flat rate and supporting parameter of the flat large-section tunnels at home and abroad, the article preliminarily evaluates the design parameters of Maluanshan Tunnel in Shenzhen – Pingshan – Yantian Expressway Project relying on Shenzhen – Pingshan – Yantian Expressway Project. The conclusion is that the design section type, flat rate and supporting parameters of Maluanshan Tunnel basically conform to the tendency of large-section design at home and abroad, are more reasonable as a whole, and but have the certain optimization space.

Keywords: large-section tunnel, flat rate, section type, supporting parameter

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