

城市道桥与防洪

主管：中华人民共和国住房和城乡建设部
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● 本期看点

- 区域多点同时施工期间交通组织整合设计实践
- 独塔单索面混凝土斜拉桥换索技术研究
- 西安市明城墙及其周边区域排水系统问题诊断及改造方案分析
- 高铁客运枢纽乘客候车时间预测模型研究



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编辑: 赵晓燕

美术编辑: 杨建华

英文校审: 孙宁萍

地址: 上海市中山北二路901号 邮编: 200092

电话: (021)55008850 传真: (021)55008850

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封面工程

本期封面工程为瓦洪公路,由奉贤区公路管理所管理,上海弘路建设发展有限公司养护。

瓦洪公路(K0+000- K7+808)北起团青公路,南至随塘河路,长7.808 km,是G1501及省道川南奉公路连接国家海湾森林公园的主要道路。

瓦洪公路全线均为沥青混凝土路面,24 m双向6车道,四块两慢的二级公路,沿线桥梁8座,乔木2 800株,绿地面积5.3万m²。

为增强典型示范效应,确保道路设施完好、交通顺畅、环境优美,上海弘路建设发展有限公司按照市文明样板路创建要求,制定了创建计划和实施办法。在创建过程中,完成了道路病害的维修,并推广应用“四新技术”,使得创建路段路容得到了较大改善,达到了“畅、安、舒、美”的各项要求,达到预期的整治成效,获评2015年度“市级文明样板路”。

瓦洪公路文明样板路的创建对加快推动城乡一体化进程,进一步改善地方整体环境,促进地方经济和社会全面协调发展起到了良好的促进作用。

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Analysis of Implementation of "Narrow Road, Dense Road Network, Open Block" Measures Wang Chun (1)

Abstract: In order to implement the urban road layout concept of "narrow road, dense road network, open block", it is required to study the implementation route from the aspects of laws and regulations, technical standards, planning implementation strategy, and according to the different characteristics of the old city area and the new city area by an example of Hefei City. The relevant opinions are puts forward from the analysis of implementation difficulties and from the revising level of laws, regulations and standards. Aiming at the different characteristics of the old city area and the new city area, the implementation route of "narrow road, dense road network, open block" is systematically proposed for the old city area and the new city area, which provides the technical reference for the pilots.

Keywords: open block, block system, road network, planning

Study on Human Factors for Road Traffic Congestion of Wuhan He Dan, Nie Lili, Yu Jinglin (4)

Abstract: Under the conditions of the great increment of motor vehicle amount, increment of transportation and many occupying-road construction, the degree of road traffic congestion shows a trend of increase in the main urban area of Wuhan, and the characteristics of the serious congestion state, congestion intensity increase, congestion mileage increase, congestion time prolonging and higher peak time congestion degree are showed locally. This paper studies the human factor influence on road traffic congestion from the people-oriented viewpoint, and puts forward the corresponding improvement measures and the proposal for the transportation development of Wuhan.

Keywords: motor vehicle amount, degree of congestion, traffic congestion, human factors

Study of Express Way Planning Scheme in Newly Built City Area Xu Yongbing (7)

Abstract: The construction of express way in the newly built city area will be greatly important to the development of the area. Taking New Century Avenue in the area of Changshu Railway Station as an example, and according to the limited condition of the area, the article compares the traffic functions, land using effects, land values, city landscapes and engineering construction costs, and analyzes the coordination relationship between the express way scheme and the area development under the different paving conditions, which provides the reference for the express way scheme.

Keywords: newly built area, express way, paving type

Traffic Optimization of Yanjiao High-tech Industrial Development Zone Xiao Han (11)

Abstract: With the integration of Beijing, Tianjin and Hebei, and the year-by-year increment of the population in the city area of Yanjiao, the heating up of real estate market brings the vitality to the whole city. But the consequent problem is the traffic congestion of city. The original roads have been hard to satisfy the demands of increasingly increased streams of people and vehicle. Therefore, the improvement of traffic environment in Yanjiao City Area is extremely urgent. The article introduces the means of traffic optimization, which can be referred for the similar projects.

Keywords: optimization of intersection node, optimization of traffic facilities, adjustment of signal timing

Study on Design of Road Engineering around Parking Lot of Urban CBD Based on Simulation Analysis

..... Xue Changsong (14)

Abstract: Taking the underground parking of Binhu Park in the center of Suzhou as an example, the microscopic simulation analysis technology is introduced into the scheme design stage. According to the multi-scheme simulation analysis of the external conditions of parking lot around urban CBD, the optimization of road engineering design scheme is realized under the different ideas, which provides the basic guarantee for the smooth traffic, energy conservation traffic and environmental protection traffic of urban CBD.

Keywords: center of Suzhou, CBD, simulation analysis, parking lot, road engineering

Practice on Integrated Design of Traffic Organization during Simultaneous Multi-point Construction

..... Zhang Xiaoxiao, Lin Tao (19)

Abstract: Based on the characteristics of traffic organization during the simultaneous multi-point construction, the thesis proposes the integrated design principle, technical route and organization method of regional traffic organization, and introduces the applications into the integrated design of traffic organization during the widening, reconstruction and construction of Chongqing Shuangfengqiao Combined Interchange, Metro Line 3 Northward Extension Line Airport Square Station and National Highway 319. The results can be referred for the organization design of the similar projects.

Keywords: multi-point construction, traffic organization, integrated design, technical route

Research on Traffic Organization during Road Reconstruction Period of City Center

..... Zhang Meikun, Xu Zhihong (25)

Abstract: By the study of traffic organization during the comprehensive reconstruction of the road in the center city, and according to the construction scheme and surrounding road network condition of road reconstruction, the traffic impact assessment analysis is carried out for the road network in the range of traffic impact, and the traffic impact of traffic organization on the surrounding road network during construction period is judged. Under the premise to satisfy the implementation condition, the traffic organization scheme is made, and the supporting traffic safety facilities are designed so as to ensure the safe traffic operation in order of the construction area, and help the smooth promotion of comprehensive road reconstruction project.

Keywords: road reconstruction, traffic impact analysis, traffic organization

Further Discussion on Gradation Design Method of Asphalt Mixture Zhang Duixue (29)

Abstract: Owing to the disadvantages of not further and not systematical study on the pavement performance of SMA asphalt mixture, the method combined with Marshall and wheel tracking tests is used to test the SMA asphalt mixture according to the practical situation in an area, analyzes the key factors influencing its high-temperature stability property, and discusses the factor influencing the high-temperature anti-rutting performance of SMA asphalt mixture. The article further discusses the more appropriate value range under various influencing factors in order to further improve the high-temperature stability property of gap grading asphalt mixture. The result shows the relational feature of the asphalt usage, volume index, flow value and Marshall stability of SMA gradation asphalt mixture so as to make the asphalt mixture have the better high-temperature property.

Keywords: asphalt mixture, gradation design, compound apparent density, void rate in frames

Elementary Discussion on Technical Gist of Preparing Feasibility Study Report on Urban Road Project
..... Li Ying, Cheng Shengping, Li Kungang (33)

Abstract: As the important basis of making investment decision, the feasibility study report plays the important role in the engineering construction. According to the engineering design characteristics and design process of urban road, the article puts forward the technical gist of preparing the feasibility study report from the role and result of feasibility study by the premise of material collection and verification. The contents of feasibility study report are completed and detailed with the strong operability, which can be referred and used by the designers during the design.

Keywords: urban road, preparation of feasibility study report, technical gist

BRIDGES & STRUCTURES

Discussion on Technical Innovation and Rational Thinking about Super-large Bridge in China
..... Mu Xiangchun (36)

Abstract: The article has introduced the technical innovation of six super-large bridges in China, further systematically analyzes the technical innovation of five super-large bridges, and puts forward the rational thinking and proposal in order to provide the reference materials and the relative enlightenment for the local similar bridges so as to promote the bridges of China to the aim of the great-power bridges in the world.

Keywords: super-large bridge, technical innovation, rational thinking

Study on Cable Replacement Technology of Single-pylon Single-plane Concrete Cable-stayed Bridge
..... Ni Hongjie, Ni Yingsheng (41)

Abstract: Owing to the imperfect protection technology of cable-stayed bridge, the stayed cable will be unavoidably corroded after the cable-stayed bridge is operated for several years. To ensure the safe operation of bridge, the cables of some cable-stayed bridges have to be replaced at home and abroad. According to the analysis on the fault status and cause of a single-pylon single-plane concrete cable-stayed bridge, the article sets forth the cable replacement process and effect in order to provide the technical support for the cable replacement of the similar cable-stayed bridges.

Keywords: single-pylon, single-plane, cable-stayed bridges, cable replacement, reinforcement

Elementary Analysis on Bridge Scheme Overpassing Existing Busy Expressway

..... Li Lei, Guo Hongmin, Zhou Jianhua (45)

Abstract: The article introduces the common bridge schemes overpassing the expressways in China including two kinds of setting up the piers or not piers in the middle strip. Taking the practical engineering project of Suzhou Middle Ring Expressway West Line overpassing Shanghai – Nanjing Expressway as the background, the article introduces the process of design, comparison and selection of this bridge schemes. There are three designed reasonable and feasible schemes. The incremental launching construction of steel box beam bridge is selected to be the recommended scheme after the detailed comparison and selection from many aspects. This project has been open for traffic now. The relative experience can be referred for the design of the similar projects.

Keywords: expressway, bridge scheme, incremental launching construction, comparison and selection of schemes

Optimization of Lateral Connection of Prefabricated Small-box Beam

..... Xiao Haibo, Shi Xianhao (49)

Abstract: The space plate element model is established by Midas compute software to analyze the stress characteristics of multi-lateral connections of small-box beam, which can be referred for the design of the similar bridges in the future.

Keywords: space plate element, small-box beam, lateral connection

Analysis and Discussion on Design of Lateral Bearing Capacity and Deflection of Isolated Foundation

..... Zhang Jiayuan (52)

Abstract: The design of bridge foundation is an important component of structure design. The reasonable design of foundation can not only provide the safety guarantee for the upper structure, but also save the engineering cost and shorten the construction period. The foundation design is required to satisfy the bearing capacity, punching shear resistance, shear bearing resistance and flexural bearing capacity of subgrade. According to the practical experience, the article demonstrates and analyzes the design of lateral bearing capacity and deflection of isolated foundation, which can be referred for the similar projects.

Keywords: isolated foundation, lateral bearing capacity, deflection, design, analysis

Analysis on Stability of X-arch Rib

..... Lei Jian (55)

Abstract: According to the engineering background of Meilin Bridge in Yixing City, the arch rib is in variable cross section, and there are many suspenders inside of the surface and many cross arms outside of surface. The stability coefficients inside and outside of surface are hard to directly obtain based on the standard and theoretical formula. It is required to use the finite element software MIDAS/Civil to establish the buckling analysis model so as to give the safety coefficients of the instability inside and outside of the first-order surface and obtain the buckling critical load. And the slenderness ratio inside and outside of arch rib is given by the back calculation of Euler formula. The integral stability coefficients ϕ_x 、 ϕ_y are obtained by the table lookup. The article analyzes and summarizes the influence of the cross arms among arch ribs on the stability of a X-arch bridge.

Keywords: X-arch, stability inside and outside of surface, safety coefficient of instability, integral stability coefficient, cross arm

Analysis on Example of Deck Hollow Web Arch Bridge Zhang Dexuan (58)

Abstract: By a practical engineering example, this paper introduces the design principle and structural analysis of a deck hollow web arch bridge in detail. Compared with the common solid web arch bridge, the deadweight of bridge structure is greatly reduced. This bridge structure is light, beautiful and generous. Its stress is reasonable. Combined with the stress characteristics of this bridge, the article introduces the establishment of model for the calculation and analysis of this bridge structure, and puts forward the reasonable treatment measures.

Keywords: arch bridge, structural analysis, crack, strength

Seismic Analysis of Double-thin-wall Pier Continuous Rigid-frame Bridge Zhang Tao (60)

Abstract: The article analyzes the dynamic property of a double-thin-wall pier continuous rigid-frame bridge in Changdu of Xizang, and analyzes the seismic performance of bridge structure by E2 earthquake acceleration time history curve in the relative standards.

Keywords: double-thin-wall rigid frame, seismic, dynamic property, response spectrum, time history analysis

Summarization on Design of South Ring Road II Bridge Crossing Beijing - Hangzhou Grand Canal in Jining City Peng Xiaogang, Wang Xiaomei, Zhou Jianlin (63)

Abstract: With the economic and social development, the steel structure is more and more used, especially for a long-span steel structural bridge. Combined with the project of South Ring Road II Bridge Crossing Beijing - Hangzhou Grand Canal in Jining City, the article introduces the practice of steel truss arch bridge firstly used in the northern area, and the complete interchange for the road of bridge head. The article specially introduces the scheme design idea, the main bridge design and the new technical application of this bridge project, which can be referred for the similar projects.

Keywords: interchange, steel truss arch bridge, steel deck pavement

Study on Bridge Structure Design and Key Technology of Jinhan Expressway and Haibin Expressway Connecting Line Project Li Lianqiang, Feng Keyan, Xiang Jinghui (65)

Abstract: The article introduces the engineering background, bridge engineering design, technical standards and several key technical issues of Jinhan Expressway and Haibin Expressway Connecting Line.

Keywords: connecting line, structure design, portal, seismic resistance, durability

Improvement of Technical Condition Assessment Methods for Highway Bridge Based on D-S Evidence Theory ... Chen Kehua, Ji Yunfeng (71)

Abstract: This article introduces D-S evidence theory into the technical condition assessment method of bridge to improve the assessment algorithm in the current norms. The assessment process of the current code is given by the real bridge information obtained from the actual inspection items. The article proposes the membership function of bridge technical condition level, and combines the weight in the bridge assessment index system with the uncertainty probability assignment in the D-S evidence theory so that D-S evidence theory algorithm can be embedded into the assessment system effectively. The improved calculation results fit with the regular calculation results better, and the assessment method is improved scientifically and validly.

Keywords: bridge assessment, standard method, membership function, DS evidence theory, probability assignment

FLOOD CONTROL & DRAINAGE

Analysis on Problem Diagnosis and Reconstruction Scheme of Drainage System in City Wall and Its Surrounding Area of Xian Liu Jingtao, Li Senlin, Zheng Ning, Shang Sibao, He Jinrong (75)

Abstract: The article introduces the investigation of drainage system in city wall and its surrounding area of Xian, analyzes the drainage standard of present drainage facilities in the studied area, and points out the main existing problems. According to the diagnosis and analysis of drainage pipeline network within the studied area and the inspection and analysis of water quality in moat, the article puts forward the comprehensive reconstruction scheme of drainage system in the city wall and its surrounding area of Xian. The study result can be referred for the reconstruction of drainage system in the old urban area or the central area of the other cities in China.

Keywords: central area, combined sewer, drainage system, reconstruction of pipeline network, Xian

Summarization on Safety Assessment and Protection Study of Corroded Large-diameter Drainage Pipe Structure Bao Yuequan, Feng Dongyang, Yu Kaihua, Xu Chan, Jiang Xiaohua (79)

Abstract: The problems of corrosion and durability are critical for the urban drainage pipes in the long-term service. Especially for the large-diameter drainage pipelines, the potential safety dangers of structure caused by the corrosion and defect are very severe. The article systematically analyzes and summarizes the studies of the defect inspection technology of buried pipe structure, the safety assessment of damaged drainage pipe, the maintenance and repairing technology of damaged drainage pipe as well as the safety assessment of corroded large-diameter drainage pipes at home and abroad. The article analyzes and studies the health status assessment, and the maintenance management systems including the standard marking system, high-ranking health consultation and decision-making management system of the typical and latest drainage pipes, and the external environmental factors influencing the structure safety of large-diameter drainage pipe, which can be referred for the safety assessment and protection study of the corroded large-diameter drainage pipe structure.

Keywords: drainage pipe, corrosion, mechanical property, safety assessment, summarization

Application of Side Stream Enrichment / Mainstream Enhanced Nitrification Process Liu Zhen, Zheng Yuyang (84)

Abstract: The nitrification of ammonia nitrogen is the important premise of sewage denitrification treatment. Therefore, the enhanced nitrification has the important meaning for the biological denitrification and sewage treatment. Om recent years, it is more and more to pay attention to the side stream enrichment / mainstream enhanced nitrification process. The article introduces the enhanced nitrification process of sludge water enriched nitrification bacteria, the return sludge aeration regeneration enhanced nitrification process and the closed double sludge age activated sludge process. The article discusses the technological flow, operation principle, technological characteristics and engineering application of three processes, which provide the reference for the construction, upgrading and reconstruction of wastewater treatment plants in the future.

Keywords: sewage treatment, side stream enrichment, enhanced nitrification, engineering application

Elementary Discussion on Common Problems and Improvement Measures of Urban Navigable River

Abstract: The urban navigable river shoulders the role of waterway transport besides playing the functions of flood drainage, water storage and conveyance. But there are many problems because of many historical causes, i.e. navigable requirements and city construction. The article summarizes the experience of river construction projects in recent years, analyzes the common problems existing in urban navigable river, and puts forward several proposals for the comprehensive improvement of this kind of river.

Keywords: navigable river, common problem, comprehensive measures

MANAGEMENT & CONSTRUCTION

Soft Subgrade Treatment of R2 Line Project of Urban Rapid Rail Transit Luo Guanxing (88)

Abstract: With the rapid development of social economy, the urban rapid rail engineering construction greatly springs up. Owing to the peculiar property of some regional geological causes, the deposited soft clay is widely distributed. Its soft soil composition is mainly the silt clay, organic matter clay, containing mass organic matters, local sand layer, multi-layer, large burial depth range and uneven thickness so as to greatly affect the project. Therefore, the soft subgrade treatment technology has to be implemented for the soft soil subgrade in order to satisfy the engineering requirements.

Keywords: rapid rail transit, R2 Line Project, soft subgrade treatment technology

Analysis on Support Scheme of Soil Nailing Wall and Stratum Deformation of Construction Process for Foundation Pit of Adjoining Road Lin Lijian, Chen Zhizhong, Zhang Lichao (91)

Abstract: A power cable project of Fuzhou City is located on the green belt of lanes at the entrance of Jinjishan Tunnel in Ring Road II. The red line of foundation pit excavation is close to the municipal road. The interrelationship of the traffic and the excavation process of foundation pit is greater. The deformation requirement is more strictly. On the basis of introducing the support design scheme of this foundation pit, the article analyzes the deformation law of surrounding strata by the tool of 2D finite element software. The numerical simulation result shows that the maximum displacement of the pit top is reached by 650 mm, which exceeds the deformation control standard of 30 mm, but the settlement of road subgrade is 29 mm distancing from 24 m of pit top, which is less than the settlement control aim of 300 mm. It can be considered that the strata deformation caused by the excavation of foundation pit does not affect the road safety, and the settlement data monitored from the practical construction process of foundation pit is also consistent with the analysis result. The numerical analysis result guides the design and construction of this foundation pit project, and also can be referred for the construction of the similar projects.

Keywords: support of soil nailing wall, finite element analysis, strata deformation, scheme design, construction monitoring

Construction Monitoring Method of Deck Spatial Curved Surface Continuous Arch Bridge Su Tao (96)

Abstract: The arch bridge has the particular line beauty. The arch bridge occupies a large proportion of urban bridges. Its spanning ability and its appearance effect all satisfy the demand of urban landscape. The characteristic of deck arch bridge is the arch rib to determine the architecture on arch. And its process control is required from two aspects of the structural stress safety and the structural alignment. The construction monitor is an essential content.

According to the simulation before construction, various loads, structural inner forces and late horizontal loads in the construction of bridge are fully considered to analyze and calculate. The relative construction data are provided. The measurement of coordinate, elevation, stress and strain is monitored in the construction so as to guarantee the safety of construction process and finally satisfy the design requirements.

Keywords: arch bridge, spatial curved surface, structure positioning, construction monitoring

Application of Steel Fiber Concrete Construction Technology in Construction of Road and Bridge and Its Sustainable Development Strategy Fan Guixiang (100)

Abstract: The steel fiber concrete technology in the construction of road and bridge is a new technology mainly to add the steel fiber and the other materials into the original concrete of road and bridge so as to make the concrete of road and bridge have the good performance and using value in the construction, and thus to realize its advantages of tensile resistance, crush resistance and high bearing capacity. Aiming at the performance and construction technology of road and bridge concrete, the article further studies and summarizes the detailed application of the steel fiber concrete construction technology, and also puts forward the sustainable development strategy.

Keywords: construction of road and bridge, steel fiber concrete, technological application, sustainable development

Study on Application of Seepage Proofing Technology in Hydraulic Engineering Construction Chen Lei (102)

Abstract: In the hydraulic engineering, it is to pay more attention to the application of seepage proofing construction technology so as to ensure the quality and performance of hydraulic engineering. In the hydraulic engineering, it is rationally to plan the seepage proofing construction technology, to maintenance the hydraulic engineering performance, to prevent the seepage problems, and to strengthen the safety control force of hydraulic engineering. The safety requirements of hydraulic engineering are very high. It should be completely to implement the seepage proofing construction technology, and to avoid the potential risk of seepage. This article mainly discusses the application of seepage proofing construction technology in the hydraulic engineering.

Keywords: hydraulic engineering, seepage proofing, construction technology

Further Discussion on Prevention Measures for Faults of Concrete Pavement in Mountains Ji Haibi (104)

Abstract: Combined with the characteristics of mountainous highways, the article comprehensively sets forth the practical construction process of the cement concrete pavement in mountainous area from the structure features of concrete pavement. The relative experience can be referred for the similar projects.

Keywords: mountainous highway, fault analysis, treatment measures, maintenance

Elementary Analysis on Distinction of Budget Preparation of Highway Engineering and Municipal Road Engineering Deng Ping (107)

Abstract: Combined with the calculation procedure and calculation method of highway engineering and municipal road engineering, the article analyzes the same points and distinction among the direct engineering fund, indirect engineering fund and profit in the fund composition. The result shows that it is all due to convergence in essence in the budget preparation. The differences are the use of industrial standards, regional

difference, norm stipulation and calculation details. Its basic cost composition is consistent.

Keywords: highway engineering, municipal road, engineering cost, difference analysis

Discussion of Engineering Investment Control in Engineering Design Stage Wang Yicheng (112)

Abstract: Aiming at the investment control of engineering design stage, the article sets forth the institutionalization construction of investment control work and the phased implementation of investment control work. On the institutionalization construction of investment control work, the article sets forth mainly from six aspects of strengthening the economic consciousness of engineering designers, improving the design quality, establishing the budget accounting management system, setting up the engineering quota design task book system, and using the optimized design in order to ensure to achieve the quota design indexes and fully to communicate with the owners. On the phased implementation of investment control work, the article sets forth three aspects of the phased implementation of investment control work, the investment control work of preliminary design financial estimation stage, and the investment control work of construction drawing budget stage.

Keywords: engineering investment, design stage, investment control, quota

STUDY ON SCIENCE & TECHNOLOGY

Study on Waiting Time Prediction Model of Passengers in High-speed Railway Passenger Terminal

..... Wang Bo, Zhou Kan, Cai Ming (114)

Abstract: In order to provide theoretical support for the analysis and prediction of the waiting time of passengers in the high-speed railway passenger terminal, the waiting time of passenger is distributed and fitted by seeking the distribution character of waiting time of the passengers in the high-speed railway terminal and based on the field investigation of waiting time of the passengers in the high-speed railway terminal. Based on the analysis of variance, the thesis analyzes the significance of the influencing factors on the waiting time of passengers in the high-speed railway terminal, and discusses the relationship between the important affecting factor on waiting time of passengers and the waiting time. The improved BP neural network is used to build the waiting time prediction models of passengers in the high-speed railway terminal and the investigated data are used to verify the validity of the model. The analysis result shows that that the waiting time of the passengers who buy tickets in advance in the high-speed railway terminal follows the lognormal distribution, and the travel time in city, the travel distance, the familiarity with the terminal, the education level and the urban transportation mode of passengers will cause significant effects. The calculation value of the built waiting time prediction model is 11.2% of the error from the average relative prediction of the investigated value. The prediction error is basically controlled within 20 min.

Keywords: transportation planning, high-speed railway terminal, variance analysis, neural network, waiting time

Study on Durability Test of C50 Machine-made Sand Concrete in Northeast Area of Yunnan

..... Li Songlin, Zheng Zhi, Geng Bo (120)

Abstract: Relying on an expressway project in the northeast area of Yunnan, the article studies the seepage resistance and freezing resistance of C50 machine-made sand concrete with the different limestone contents

and fly ash contents, and achieves the influence rules of limestone and fly ash on the durability of machine-made sand concrete, which can be referenced for the application of the high-strength machine-made sand concrete in the projects.

Keywords: machine-made sand, limestone, fly ash, seepage resistance, freezing resistance

Study on Performance Evaluation of Asphalt Concrete Pavement of Municipal Road ... Wang Meng, He Yan (123)

Abstract: In order to study the influence factors, evaluation methods and preventive measures of the asphalt concrete pavement performance of urban road, the practical engineering is studied and analyzed by the analytic hierarchy process. The results show that factors affecting the asphalt concrete pavement performance of municipal road are the natural factors and human factors. 11 indicators suitable for the performance evaluation of municipal asphalt concrete road pavement are daily maximum rainfall, temperature, traffic volume, overload, drainage status, surrounding construction situation, pavement location, existing disease, design level, pavement construction quality and road service years. The pavement performance of municipal asphalt road is suitably to divide into three grades: Grade I, II and III, and the different maintenance countermeasures are taken for the different grades.

Keywords: municipal engineering, asphalt concrete pavement, pavement performance, analytic hierarchy process, evaluation index, maintenance countermeasure

Analysis on Stress Change Rate of Three-span Skew Continuous Beam Liu Liang (127)

Abstract: The finite element software is used to establish the models of continuous beam with different slopes, which can calculate the stress of the midspan position of three-span continuous beam, and can get the law of the stress change of the continuous beam under the different slopes, especially, the change of top plate and bottom plate of double-chamber box girder is mostly significant. The analysis conclusion shows that the greater is the slope, the smaller is the stress change rate under the concentrated force. The slope obviously affects the stress change rate on flange plate. The stress change rate is smaller while the slope is smaller. The stress change rate is larger while the slope is larger.

Keywords: continuous beam, skew, stress, change rate

Analysis on Impact of Meso-damping Coefficient in Simulation of Cyclic Triaxial Granular Flow

..... Xu Guojian, Shen Yang (130)

Abstract: The granular flow software PFC2D is used to carry out the simulation of basic mechanical properties of silty soil. The granular flow simulation of dynamic properties of silty soil under cyclic loading is carried out by means of strain control mode. With the increase of the Meso-damping coefficient of granular flow, the pattern of hysteresis loop is gradually from the narrow long to plump, and the peak value of deviatoric stress is increased simultaneously. And with the same amplitude value of deviatoric strain and a damping coefficient in the range between 0.5 and 0.8, the peak value of deviatoric stress for test sample shows the approximate liner growth. But under the higher deviatoric strain amplitude level, the impact of the Meso-damping coefficient is smaller on the development of dynamic property. In addition, the energy analysis is used to explain the energy dissipation restriction of cyclic loading in the granular system. The Meso-damping coefficient of granular flow is derived to a certain extent to determine the dissipation degree of the energy transmitted by the external load of granular system so as directly to affect the development of stress

and strain in the samples.

Keywords: cyclic triaxial, granular flow, Meso-damping coefficient, energy analysis

APPLICATION OF ACHIEVEMENTS

Prediction of subgrade settlement in transition section based on multinomial Gauss function

..... Wang Jiangrong, Zhao Rui, Yuan Weihong, Ren Taiming(135)

Abstract: The settlement of subgrade settlement of high-speed railway is a complex nonlinear system, and it is very important to improve the prediction accuracy of subgrade settlement for high-speed railway construction and operation. By using the MATLAB toolbox to establish the single factor Gauss model of the settlement and the accumulated time and the height of the accumulated fill, the linear regression analysis is used to obtain the two single factors. Empirical analysis shows that the integrated model has high accuracy, and the prediction effect is better than BP neural network model, which can guide the engineering construction.

Keywords: subgrade settlement of transition section; Gauss's function; comprehensive model; nonlinear regression; prediction.

Application of New Heat-resisting Wear-proof Plate in Sliding Plate Rubber Support

..... Zhang Yinxi, Hao Hongxiao, Cao Zhifeng, Wu Haibin (138)

Abstract: Based on the using requirement of elastic sliding plate rubber support, a new heat-resisting wear-proof plastic HLIDE is used to develop a newly elastic sliding plate rubber support. According to the study on the structure characteristics of pot rubber support and spherical support, the design method of using the sliding plate to separate the rubber support can complete the design of support structure. The card slot steel plate is installed between the sliding plate material of this support and the body of rubber support. The sliding plate is installed in the card slot steel plate. The test result shows that the sliding plate in the card slot steel plate after tested is not deformed and damaged. Under the condition of the sliding plate material bearing the dry friction of 11.9 MPa vertical pressure, the sliding friction coefficients of PTFE and UHMWPE materials separately increase 25.9% and 170.4% by compared with HLIDE material.

Keywords: seismic mitigation and absorption, elastic sliding plate support heat-resisting wear-proof plate, structural design, friction test

THE RELATIVE SPECIALITIES

Design of Connected Structure of Suzhou Yuanhetang Bridge Pylon Building Project

Li Yuanjian (141)

Abstract: Two buildings or several buildings are connected with each other by overhead connector so as to satisfy the requirements of building modeling and using function. The bodily form of connected structure is more complex than the general structures because of using the connector to connect the different structures. Therefore, the stress of connected structure is more complex than the general single structure or the multi-pylon building structure. The article further discusses the gist for attention in the design of this kind of structure by the practical projects.

Keywords: connected structure, forced connection, weak connection, support of connector

POT Model of Operation Vehicle Load under Toll-by-weight Mode

..... Zhao Gaopeng, Huang Haiyun, Zhang Junping, Yuan Weizhang (143)

Abstract: At present, the vehicle overloading and overrun operation phenomenon of expressway is particularly serious in China. It is urgently to study the extreme value of the operating vehicle load under the toll-by-weight mode and its development trend. On the basis of dynamic weighting data of an expressway in Guangdong Province under the toll-by-weight mode, the gross vehicle weight is statistically analyzed by the motorcycle type of vehicle load. The extreme value theory is used to establish the POT model, to achieve the tail distribution function of gross vehicle weight, and scientifically to forecast the extreme value of vehicle load possibly appeared in any return period. Results show that the super-large tonnage vehicles appearing in this high speed section is not accidental, and the more larger tonnage vehicle load will possibly appear in the future, which will pose a serious threat to the safe operation of the bridges and roads, and can be referred for effectively controlling the overload of the operating vehicle.

Keywords: vehicle load, toll by weight, extreme value theory, POT model

Research on Stress State of Primary Lining of Bored Tunnel in Rail Transit Area of Lanzhou

..... Cao Xiaoping, Sun Shoubang, Zhang Wenxue (147)

Abstract: According to the measurement and analysis of surrounding rock pressure and steel arch axial force of the bored tunnel in rail transit area of Lanzhou, the stress state of primary lining of the tunnel during the construction of bored tunnel in the recently piled up loess of the rail traffic in Lanzhou, and the relationship between the axial force of primary lining and the pressure of surrounding rock are mastered. The results show that there is a maximum of surrounding rock pressure at the top of arch generally, and the plastic deformation easily causes there. At the same time, the axial force of steel arch and the pressure of surrounding soil are correlative, and the axial force of steel arch is also larger at the position of larger pressure of surrounding rock.

Keywords: rail transit, bored tunnel, pressure of surrounding rock, primary lining

Study on Construction Method of Shallow-buried Railway Tunnel beneath High-voltage Transmission Tower

..... Xuan Junjie, Zhao Tianming (150)

Abstract: By Wangqiao Tunnel of Jiuqing Railway as an engineering example, based on the risk analysis, and combined with the monitoring measurement and numerical simulation means, the construction scheme is comprehensively analyzed and calculated. The comprehensive construction scheme of "ground surface grouting reinforcement + mechanical excavation + strengthening design support parameter + settlement monitoring" is reliably demonstrated. The practice has proved that the settlement of tunnel arch and the deformation of the mountain high-voltage transmission tower are all within the allowable ranges under the condition of this construction method, and the technical and economic effects are very obvious, which can be referred for the similar projects.

Keywords: shallow-buried and large-span, tunnel, beneath, monitoring measurement, numerical simulation, construction method

Elementary Discussion of Water Plant in Wetland

..... Guo Xianqiong, Yi Yu (154)

Abstract: Taking Nanjing Qiqiaoweng Ecological Wetland Park as an example, the article sets forth an artistic skill of using a higher ornamental value of wetland plant as the material scientifically and reasonably to allocate

the water and to build the wetland landscape in order to fully play the natural beauty of the plant posture and color in wetland and to reach the harmonization and unification of natural beauty and artistic beauty. Based on the characteristics of community, the arbor, bush and water plant are reasonably used to allocate and establish the multiformity of wetland plants.

Keywords: wetland, water plant, invasion, animal habitat

Study Progress and Countermeasure Analysis of Environmental Risk Management in Industrial Park
..... Zheng Jun (154)

Abstract: In recent years, the industrial parks have been developed rapidly in China. The economic growth brings the serious environmental concerns at the same time. Industrial parks have become the focus of environmental pollution and environmental risk management. Aiming at environmental risk management of industrial park, this paper systematically summarizes the whole process of environmental risk management, discusses the technical methods and progresses in the stages of environmental risk identification, risk analysis, risk assessment and risk management of industrial park in detail at home and abroad, and specially puts forward the risk management proposal of industrial park in China.

Keywords: industrial park, environmental risk management, risk information management system

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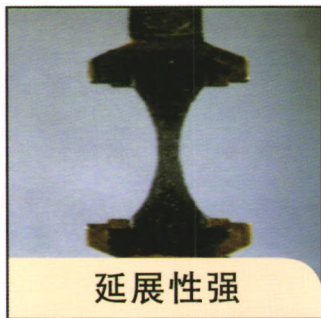
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