

城市道桥与防洪

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图为兰州市城市建设设计院设计的
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《城市道桥与防洪》

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● 本期看点

- 城市非机动车网络化建设思路研究
- 大悬臂预应力宽箱梁桥空间效应研究
- 特大管涵运行现状分析综述
- 基于实际数据的宏观基本图磁滞现象及分析



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封面工程

本期封面工程为兰州市北龙口—水阜—秦王川城市快速路工程(水阜—秦王川段,简称“水秦快速路”),由兰州市城市建设设计院设计。

水秦快速路是连接兰州新区与兰州市区基础设施建设的重大项目——兰秦快速路工程中的一段,其起点为水阜,经涝池、赵家铺,终点接兰州新区纬一路,道路全长 25.15 km。区间道路(K0+000—K23+760段)路基宽度 40 m,新区规划区内(K23+760—终点段)路基宽度为 70 m,设计行车速度为 80 km/h,设计等级为城市快速路,按双向 8 车道标准设计。道路全线共新建桥梁 4 座,通道桥 6 座,涵洞 46 道,共设立交 4 处。道路沿线还设置了完善的交通系统、排水系统、照明系统及绿化系统。该项目于 2010 年 10 月开始设计,2011 年 7 月开始施工,竣工时间为 2014 年 6 月。

兰秦快速路项目是兰州市基础设施的重要组成部分,也是兰白都市圈、兰州新区与兰州市之间联系的纽带。兰秦快速路的建设加快了兰州市区、兰州新区、皋兰县及永登县的开发改造进程。该项目获得“2016 年度甘肃省优秀勘察设计一等奖”。

Urban Roads, Bridges & Flood Control

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BRIDGES & STRUCTURES

Research on Network Construction of Non-motorized Vehicles in Cities Chen Ou (1)

Abstract: Under the rapid urban expansion and the economic diversification shock, the original "residential courtyard and factory" economy as the leading position of balance is gradually replaced by the migratory-bird large-zone balance of "residence place and working ground". The original non-motored vehicle network has been not far able to adapt the new traffic characteristics. Aiming at this urban reform, the article analyzes the problems existing in the present non-motored vehicle network, and puts forward the optimized concept for this reform. Taking the urban sub-center of Beijing as an example, the article introduces the establishment of the new non-motored vehicle network, which provides the concept and method for planning and designing the similar urban non-motored vehicle networks.

Keywords: non-motored vehicle network, function, supported service facilities, commuting network, movement network

Research on Scheme of North Interchange in Zhongshan City He Changming, Li Jun (5)

Abstract: The article studies the new interchange scheme at a node of North Ring Road in Zhongshan City. This interchange is proposed to intersect an expressway with three urban high-class roads. It is required to consider the traffic conversion of the charge system and non-charge system roads, and also to consider the influence of newly built interchange on the existing interchanges. Based on the surrounding conditions and traffic analysis of the project, the article puts forward three design concepts of interchange scheme and four representative interchange schemes. The article comprehensively compares and analyzes four interchange schemes from the aspects of interchange function, scale, land, removal, adaptation and modeling, and finally puts forward the proposed scheme with more complete functions, suitable scale, beautiful modeling and better combination with the status, which can be referred for constructing the interchanges near the urban areas in the similar expressways.

Keywords: expressway, urban expressway, urban area, interchange, scheme study

Study on Overall Scheme of Rapid Reconstruction of North Bridge Road in Nanjing Kong Qingqing (10)

Abstract: According to the background and the functional orientation of the rapid reconstruction of the North Bridge Road in Nanjing, based on the analysis of the planning and construction conditions, and combined with the analysis of the traffic flow, the article studies the overall scheme of rapid reconstruction of the North Bridge Road in Nanjing, and each node scheme. The study result shows that the rapid reconstruction of the North Bridge Road in Nanjing can relieve the traffic pressure in the main urban area of Nanjing, perfect the road network in Jiangbei New Area and enhance the environmental quality along the road.

Keywords: rapid reconstruction, overall scheme, node scheme, traffic demand

Reconstruction Technology of Highway Based on Integrated Functions under Background of New Town Movement

..... Zhang Meikun (14)

Abstract: With the continuous development of city social economy, more and more original suburbs are constructed to new towns. In this process, the original highways are required to reconstruct. And the design of highway reconstruction also has the bright characteristics. The consideration emphases is converted from mainly satisfying the fast traffic function of highway to gradually the integrated functions of slow traffic demand, landscape greening demand, municipal pipeline demand and intelligent traffic management demand of urban road traffic. Taking the integrated reconstruction of Jintan Avenue in Jintan City as the engineering case, the article analyzes the highway reconstruction technology under the background of new town movement, and introduces the highway reconstruction scheme based on integrated functions.

Keywords: new town movement, highway reconstruction, integrated function, Jintan Avenue

Status Analysis and Optimization Design of Campus Traffic

..... Huang Xinqing, Xiao Shanglin, Jiang Siyi, Chen Peng, Xu Dan (18)

Abstract: Campus traffic is an important part of the overall campus planning. With the continuous expansion of the university campus area, the corresponding planning theory and design method of campus traffic are lacking. In order to improve the traffic congestion on the campus of Zhejiang Normal University and to ensure the safety and efficiency of the trips of teachers and students, this paper analyzes the existing problems of campus traffic in Zhejiang Normal University by investigating the number and distribution of parking spaces on the campus, and puts forward the optimization schemes of limiting the time of one way in the main roads, increasing the branch roads, optimizing the road signs and marks, and adding parking spaces. The software of VISSIM is used to simulate the optimization result of campus. The simulation result shows that the vehicle parking delay time is

reduced, the passengers are separated from the security is improved and the congestion is relieved.

Keywords: campus traffic, traffic planning, optimization design, VISSIM software, simulation technology

Study of Traffic Organization in Construction Period of Urban Important Municipal Infrastructure

..... Zhang Futian (22)

Abstract: The urban traffic congestion is the common failing in every big city of China. The urban traffic congestion problem is required to solve in China. It is necessary further to strength the construction of urban municipal infrastructure. The construction period of the important municipal infrastructure, i.e. rail transit and urban viaduct is longer. If poor traffic organization during construction, it will further intensify the urban traffic congestion and seriously affect the production and living of the urban residents. Taking the traffic organization in the construction of Qingdao Haiwan Bridge Connection Project as an example, the article sets forth the method and measures taken for the traffic organization during the construction of urban important municipal infrastructure, which can provide the experience and reference for the flow adjustment in the construction of similar urban important municipal infrastructures.

Keywords: traffic congestion, construction of important municipal infrastructure, analysis of traffic flow adjustment, traffic organization during construction

Survey Analysis and Treating Proposal of Bridge Head Bump in Main Urban Area of Wuhan City

..... Zhang Lihua, Liu Yazhou (26)

Abstract: The situation of bridge head bump in the main urban area (especial in lake accumulation areas on the first terrace and third terrace) of Wuhan City is more completely surveyed and analyzed. A series of measures and proposals of design, construction and maintenance are put forward so as further to improve the management quality of urban road. The relative experience can be referred for treating the bridge head bump on the soft soil subgrade of the other cities.

Keywords: Wuhan, bridge head bump, survey, analysis, proposal

Summarization on Present Situation and Development of Noise Reduction Pavement Technology ... Yao Tianyu (30)

Abstract: Aiming at the summarization on the noise problems of municipal road pavement and the existing noise reduction technologies at home and abroad, the article introduces the classification and source of pavement noise, and the noise reduction measures of pavement, analyzes the noise reduction mechanisms of the different pavements, and discusses the development trend and direction of noise reduction technology.

Keywords: municipal road, pave noise, noise classification, noise-reducing pavement, present situation of study

Influence of Hot Aging on Pavement Performance of OGFC Asphalt Mixture Shang Zhigang (33)

Abstract: SBS modified asphalt and 70# matrix asphalt are used to mix OGFC-13 asphalt mixture. The loose mixture is hotly aged for 4 h under 1350 C and 1650 C separately to simulate the short-term aging of mixture. Later, the drainage performance, high-temperature stability and water stability of the different mixtures before and after aged are tested and compared. The test results show that the pavement performances of SBS modified asphalt mixture before and after aged are better than SK-70 matrix asphalt mixture. For two kinds of asphalt mixtures after aged, the water stabilities reduce in a certain range, and the permeable coefficient and dynamic stability of mixture improve to some extent.

Keywords: asphalt mixture, OGFC, hot aging, pavement performance

Study on Comprehensive Repairing Method of Bridge Abutment Back Embankment

..... Niu Jianfeng, Wei Dong, Zhao Yong (36)

Abstract: The phenomenon of "bump" and "board breaking" will cause on the bridge abutment back embankment because of compaction difficulty, roadbed settlement and filling loss after road operation for some time so as to cause the driving safety problems. Taking the abutment back embankment repairing project of 13 bridges on four roads in Lingang New Town of Shanghai as an example, the article discusses the damage causes of bridge abutment back embankment, and based on the different damage levels of embankments, divides the faults into the different types, and separately designs the different treatment methods, which provide some design basis for repairing the similar bridge abutment back embankments.

Keywords: difference settlement, filling loss, roadbed backfill, grouting, slope adjustment and covering

Engineering Design of Undercrossing Tunnel in Middle Quzhou Road of Quzhou City Gong Zuo (40)

Abstract: At present, the traffic pressure of Middle Quzhou Road is greater closely to saturation. According to the study, analysis and the local relative cases, the type of urban underground road is proposed to separate the traffic of motored vehicle in the historical cultural street section of Shuitingmen in order to solve the contradiction between the urban feature orientation of creating the urban brand and sport leisure and the present surrounding traffic travel. The relative experience can be referred for the similar projects.

Keywords: road engineering, design scheme, factor analysis, Middle Quzhou Road, undercrossing tunnel

BRIDGES & STRUCTURES

Study on Spatial Effect of Long-cantilever Pre-stressed Wide-box Girder Bridge ... Le Xiaogang, Yu Xiaolin (43)

Abstract: In order to study the spatial effect of long-cantilever pre-stressed concrete wide-box girder bridge,

the finite element software ANSYS is used to establish the fine spatial numerical model in order to compare the calculation results under three conditions of no prestressing, longitudinal prestressing, longitudinal prestressing plus transverse prestressing. The influence of prestressing on the spatial effect of bridge is analyzed. The distribution law of spatial stress under the actions of movable load and torsion is studied. The result shows that the longitudinal and transverse prestressing greatly improves the stress status of bridge. The influence of movable load on the structure is weakened quickly from the mid-span section to pier top section. The torsion effect of girder near pier top is very strong, and the torsion effect of girder top slab is much smaller than the base slab.

Keywords: long cantilever, box girder, spatial effect, finite element

Study on Design of Multi-span Arch Beam Combined Bridge Li Zhao (47)

Abstract: The article introduces the design process of a cross-sea bridge. This bridge is a cross-sea vehicular bridge connecting an artificial island and land. The bridge structure is the five-span arch and beam combined system. Its structure is complex, and its arch ribs are up and down with the beautiful modeling.

Keywords: arch and beam combined system, X-shaped arch, anchoring frame, flutter instability, vortex-induced vibration

Study on Key technology of Multi-span Continuous Arch Landscape Bridge Crossing Sea Yang Fan (51)

Abstract: The multi-span continuous arch landscape bridge has the advantages of beautiful landscape, low construction cost and known construction technology. The article analyzes the overall layout, calculation, design, construction and durability of multi-span continuous arch bridge. A triangle frame system is formed by the upper of main arch with the web arch so as to produce the great temperature force. The normal reinforcement is hard to meet the requirements at all. Therefore, it is required to separate the web arch from the main arch. The web arch is supported on the main arch by the simple supporting mode. The durability design is a key point in the design of cross-sea bridge. The comprehensive measures of increasing the protection layer, controlling the cracks, implementing the surface coating and adding the corrosion inhibitor are required to take.

Keywords: multi-span continuous arch, durability, construction sequence

Design and Innovation of Xinan Bridge on Dongbao River in Shenzhen ... Dai Liang, Chen Yiyang, Tao Muxuan (55)

Abstract: Restricted by the red line of the planned road and the factor of 500 kV high-voltage corridor, and also in order to satisfy the navigation and flood control requirements under the bridge, the main spans of Xinan

Bridge on Dongbao River are 88m+156m+88m. Its superstructure is the wave-shaped steel web pre-stressed concrete continuous box beam. In order to solve the difficulties in the concrete crack of box beam at the mid-span, the shear bucking of web and the design of connectors, the concrete bedplate at the lower flange in the middle span area is creatively replaced by the better tensile resistance of steel plate, which can effectively lighten the deadweight, optimize the structure stress and solve the bedplate crack. The transit connection section is set up between the steel bedplate and the concrete bedplate, and is combined by the welding mails and open hole plate. In order to study the stress performance of the combined box beam of steel bedplate in the middle of span, the model experiment and finite numerical analysis is carried out. The result shows that its design is reasonable and reliable.

Keywords: wave-shaped steel web, combined structure, combined beam

Analysis on Design Gist of Double-inclined-Pylon Cable-stayed Bridge

..... Pei Tao, Li Qunpeng, Du Yinghui, Liu Muqing (58)

Abstract: Caofeidian Bridge 2# is a unique structure of high-low pylon no back-cable cable-stayed bridge. Its span combination is 166 m + 104 m. This article fully analyzes its structure characteristics, and introduces the detailed design of the structural system and the main stressed components in order to realize the effective unity of structure stress and landscape requirement, which provide the valuable experience to design and construct the similar bridges in the future.

Keywords: landscape bridge, bridge aesthetics, combined bridge, inclined pylon cable-stayed bridge, high-low pylon cable-stayed bridge, no back-cable cable-stayed bridge

Design and Study on Spatial Combined Pylon of Beng River Bridge in Xian Road of Linyi City ... Zhang Hui (61)

Abstract: Beng River Bridge in Xian Road of Linyi City is a single-pylon cable-stayed bridge. The bridge pylon is a spatial alien combined pylon composed of three pylons. The article introduces the overall design scheme of bridge pylon, and focuses analysis on the structures and mechanical properties of important nodes of the anchor cable zone of spatial alien combined bridge pylon, the steel and concrete combined place of pylon and the connecting rods among pylons, and the key technical technologies of integrated mechanical properties of three pylons, partial stress of steel structure in stayed cable anchorage zone, stress of steel and concrete combined place of pylon, and stress of connecting rods among pylons, which can be referred for the design of the similar projects.

Keywords: cable-stayed bridge, spatial combined bridge pylon, steel and concrete combined structure, connecting rod

Discussion on Design of Nanping Double-deck Steel Truss Arch Bridge

..... Guo Jiye, Du Jiancheng, Gao Kangping (65)

Abstract: According to the design of Nanping Bridge, the article discusses the selection of truss style, the drafting of dimension, the adjustment of inner force and the wind resistance of suspender of the double-deck steel truss arch bridge.

Keywords: double deck, steel truss arch bridge, truss style, adjustment of inner force, wind resistance of suspender

Elementary Analysis on Plane Design of Small-span and Middle-span Curve Simple-supported Beam Bridges ...

..... Zhang Dexuan (68)

Abstract: In the design of urban bridges, a part of bridge is placed on the curve section of road owing to restricts of various factors, which cause some difficulties to the design and construction. As the simple-supported beam bridge more commonly in the city construction, the optimized plane design is used under the premise of how to control construction cost, to shorten the construction period and to be simple construction. According to a detailed engineering case, the article introduces several plane design methods of small-span and middle-span simple-supported beam bridges on the curve section of road, which satisfies not only the bridge standard, but also the convenient construction so as to effectively save the engineering construction cost.

Keywords: simple-supported beam bridge, middle vector method, plane design

Design of Steel Tube Column Bracket in Segment 0# of Continuous Beam Bridge

..... Zhou Manling, Wang Changfeng, Shu Kang (71)

Abstract: The bracket and steel tube column are the temporary structures commonly used in the segment 0# construction of bridge. According to the segment 0# construction practice of a bridge, the article introduces the design of temporary structure scheme of combined the bracket with steel tube column. The finite element integral model is established to analyze its stress distribution. The analysis result shows that the structure can satisfy the construction requirement, and this structure has the obvious advantage able to solve some special construction requirements well. This scheme has the wide using prospect.

Keywords: segment 0#, steel tube column bracket, construction scheme, design

Design and Calculation of Box Beam Overpassing Fenjin Road

..... Wu Jun (74)

Abstract: Taking the bridge overpassing Fenjin Road, the article introduces the relative design standards, bridge span layout and structure design, and calculates and analyzes the box beam structure in detail, which can be referred for the design of the similar bridges.

Keywords: box beam, structure design, calculation and design

Discussion on Design of Bridge Pier Base Slab Crossing Subway Tunnel Gu Zhenmiao (77)

Abstract: According to the study object of the overpass base slab, the 3D finite element software is used to establish the element model of the bridge base slab. Aiming at the characteristics of bridge pier base slab crossing the shield tunnel of subway under operation, the article discusses the design gist of this kind of base slab. The relative model is established to study the influence of construction and excavation of base slab on subway.

Keywords: crossing subway under operation, subway tunnel, design of base slab, influence analysis

Design of Steel Temporary Bridge under Special Overload Vehicle Load Yu Xuehui, Zhang Yan (83)

Abstract: The special overload vehicle is often used for the transportation of large-sized equipment. In an engineering case, the vehicle load standard is gross weight 526 t and axle load 34 t. The newly built temporary bridge is used in the passing scheme. The superstructure of temporary bridge is mainly the type 321 standard steel truss beam, and the substructure is mainly the steel pipe pile foundation. The article introduces the design scheme of steel temporary bridge under the special overload vehicle load, which can be referred for the design of the similar bridges.

Keywords: special overload vehicle, standard steel truss beam, steel temporary bridge, large-sized equipment transportation

Overhaul Design of Fish-belly Riveted Steel Truss Girder in Zhejiang Road Zhang Chunlei (86)

Abstract: Zhejiang Road Bridge crossing Suzhou River is a fish-belly simple-supported steel truss girder structure in Shanghai. After the service over 100 a, the integral is transported to a bank for overhaul. According to the traffic demand and structural varying capacity, the space of the main trusses is widened and the traffic function is improved. The most of main truss member bar is reserved, and the seriously rusted components are replaced. The structure of deck system is renewed and the waterproof structure details are improved for strengthening the durability. The portal frame and lateral bracing are restored to the original truss structure. The sidewalk railing is also restored as it is. After overhaul, Zhejiang Road Bridge can be continuously used for 50 a.

Keywords: steel truss beam, fish-belly truss frame, riveting, bridge overhaul, historical relic

Statistics and Analysis of Bridges Collapsed by Flood in 2007~2015 Liu Kang, Liu Junli, Yu Wencheng (90)

Abstract: The flood and its caused river-bed scour are always the important factors affecting the safety of

bridges in service, and are the main reasons causing the collapse of bridges in service. The article introduces the survey and statistics of bridge collapsing cases caused by the flood in recent 10 years in China, sums up and analyzes the general rule of bridge collapsed by flood. The results show that the design standard of the bridges collapsed by flood is generally low, the embedment depth of foundation is shallow, the fault is serious, and the proportion of damaged bridge is high. The sand excavated near bridge place is serious to damage the river bed and intensify the scour. Based on this, the relative countermeasures and proposals are put forward, which can be referred for the design, construction and maintenance of bridges.

Keywords: bridge in service, flood, collapsing case, scour

FLOOD CONTROL & DRAINAGE

Analysis and Summarization on Present Operation of Super-large Pipe Culvert
..... Yu Kaihua, Bao Yuequan, Yang Qingpo, Jiang Xiaohua (93)

Abstract: According to the analysis on the present operation status and its damage study result of the super-large pipe culvert, the article summarizes some defects of the estimation and applicability in the study of pipe culvert now, and also puts forward to establish a set of systematical study idea of damage mechanism study, damage bearing capacity estimation study and engineering countermeasures study after damage, and to build the full-life health management data platform of pipe culvert.

Keywords: super-large pipe culvert, damage, estimation

Study on Regulation Scheme of High-pile Wharf in Xinhua Area along Huangpu River Lin Jiong (95)

Abstract: The article briefly describes the detection, appraisal and several regulation schemes of the structures in the high-pile wharfs in Xinhua Area along Huangpu River, and comprehensively analyzes and compares the advantages and disadvantages of several schemes.

Keywords: old revetment, floating landing stage, retaining wall, rock filled stratum, green line of river, regulation scheme

Application of Ribbed Floor Structure in Embankment Project Ming Wei (98)

Abstract: With the fast development of society and economy in China, the requirement of the people for the riverside environment continuously improves accordingly. It is extremely urgent to reconstruct the riverside embankment. The earth-sheltered architecture is constructed under the earth embankment in order to achieve the purpose of composite using of embankment at the same time of reconstructing slow-slope

embankment of Wuqing Dike. As a part of embankment structure, the requirement of earth-sheltered architecture is higher than the common buildings not only satisfying the bearing safety of structure, but also ensuring the safety of flood control. According to the comparison, selection and analysis of structure safety, flood control safety and engineering investment, the ribbed floor structure is determined to use for Wuqing Dike Earth-sheltered Architecture Project.

Keywords: embankment, earth-sheltered architecture, ribbed floor, formwork, design, construction

MANAGEMENT & CONSTRUCTION

Discussion on Soil and Stone Filled Roadbed Construction Technology Li Juan (100)

Abstract: Aiming at the present situation of soil and stone filled roadbed in the mountain area of China, the article introduces the characteristics and engineering feature of soil and stone mixture, summarizes the construction gist of soil and stone filled roadbed, and finally introduces the Ryan wave nondestructive testing technology on the basis of the traditional compactness inspection method.

Keywords: soil and stone filled roadbed, engineering feature, construction gist, inspection method

Comparison, Selection and Implementation of Suspender Tension Cable Adjusting Method of Bowstring Arch Bridge Nian Fulong (103)

Abstract: Taking the bowstring arch bridge of Hubei Bridge in Daluxian Channel Improvement Bridge Project Phase II in Shanghai as an example, the article compares and selects the suspender tension cable adjusting methods – the batch tension cable adjusting method based on influence matrix method and the synchronous intelligent tension cable adjusting method controlled by computer in the construction monitoring process. The amount of calculation for the suspender tension force is large if the conventional batch tension cable adjusting method of suspender is used. The error accumulation of suspender force is required to adjust for many times. But the adjustment and control of suspender force by the synchronous intelligent tension cable adjusting method is convenient and exact, and the tension speed is fast. The engineering practice of Hubei Dock Bridge shows that the superiority of synchronous intelligent tension cable adjusting method is clear, which is worth of reference for the similar projects.

Keywords: bowstring arch bridge, construction monitoring, suspender force adjustment, influence matrix method, synchronous intelligent tension cable adjusting method

Study on Construction Technology of Asymmetric Bowstring Arch Bridge
..... Hong Quan, Chen Liang, Guo Huiguo, Xu Jian (107)

Abstract: The article briefly introduces the engineering situation of this asymmetric bowstring arch bridge, and the

layout of bridge structure. Also based on the structure type and stress characteristics of bridge, the article briefly discusses the processing technology of space section steel arch rib, the control technology of steel structure and the installation technology of space box steel arch rib of the bridge.

Keywords: space arch axis, 3D lofting technology, space variable section steel arch, steel structure control technology, steel arch rib installation technology, narrow space

Tensioning Construction Technology of Combined Jack for Stayed Cables

..... Yang Tianwei, Chen Kang, Huang Yufan (110)

Abstract: The stayed cable tensioning of cable-stayed bridge is the key of engineering control. There are the special requirements for the tensioning equipment because of large tensioning tonnage of stayed cable and small inner cavity space in cable pylon anchorage zone. Combined with the practical conditions, the combined jack is used in the project of Yongchuan Changjiang Bridge for the tensioning construction of stayed cable. In a half year, the high-efficient and high-quality tensioning and cable adjusting work of 152 stayed cables is completed.

Keywords: stayed cable, combined jack, tensioning construction

Application of Integrated Slope Lifting Technology in Interchange Reconstruction Project

..... Pan Yueshun, Dong Quanbao, Li Liliang (113)

Abstract: Taking the integrated slope lifting project of westward extension (Zhonghua Avenue ~ West Ring II) PM13#-PM22# piers in West Heping Road Viaduct of Shijiazhuang City as an example, the article introduces the application of integrated bridge slope lifting technology in the reconstruction project of urban viaduct. The relative experience can be referenced for the similar projects.

Keywords: slope lifting, viaduct reconstruction, PLC lifting system, construction technology

Selection of Scaffolding System for Construction of Capping Beam of Urban Viaduct

..... Cao Jianfeng (117)

Abstract: Combined with South Hongmei Road Viaduct Project and aiming at the cast-in-situ construction of capping beam of urban viaduct, three different scaffolding systems are proposed. Based on the construction characteristics of urban viaduct, the suitable construction scheme is selected, which can be referred for the construction of the similar projects.

Keywords: urban viaduct, capping beam, scaffolding, no landing, bars

..... Application of Bubble Mixed Light Soil in Interchange Project in Coastal Area Gao Yi (120)

Abstract: This paper sets forth the application of bubble mixed light soil in interchange projects in coastal areas, and introduces the construction technology and construction methods of bubble mixed light soil in

detail in order to provide the reference for the construction of the similar projects.

Keywords: bubble mixed light soil, coastal area, construction technology, reference

Analysis on Influence Factors and Control Measures of Asphalt Concrete Production Temperature
..... Deng Guomin (123)

Abstract: The temperature is not only an important index to evaluate the quality of asphalt concrete, but also a basis to indirectly reflect the raw material preparation, personnel operation and equipment operating conditions. The article analyzes the factors influencing the asphalt concrete temperature, and puts forward the corresponding control measures, which are the keys to ensure the stable and sustainable production of asphalt concrete.

Keywords: temperature, asphalt concrete, factor, measures

STUDY ON SCIENCE & TECHNOLOGY

Phenomenon and Analysis on Hysteresis of Macro Basic Graph Based on Actual Data
..... Fu Qiang, Tian Guanghua, Jiao Xiaolong (125)

Abstract: The macro basic graph theory is a new simple mathematic tool for the management study of road network, and can greatly decrease the complexity to analyze the road network. The hysteresis phenomenon of macro basic graph is one of the basic issues in this theory. According to the actual data of the express road network in Shanghai, the article proves the existence of macro basic graph. The hysteresis cause of macro basic graph can be summarized from the selection of detectors in the typical road sections in the small range of collection and statistics. The study shows that the non-synchronization of congestion among detectors is one of the main reasons causing the hysteresis. The range of hysteresis loop is related to the duration of congestion.

Keywords: traffic engineering, macro basic graph, hysteresis

Analysis of Regular Passengers Ratio in Rail Transit Network
..... Bao Feng, Wang Bo, Huang Jianling, He Zhiying (129)

Abstract: According to the holiday characteristics of regular passenger ratio data in urban rail transit, and in the elimination of the trend term of regular passenger ratio data, the dummy variables for representing the holiday features are introduced, the impact of holiday factor on the ratio of regular passengers is quantified, the regression model between the dummy variables of the regular passenger ratio data and the time and

holiday characteristics in order to achieve the goal of eliminating the impact of the trend term and holiday characteristics, and at the same time to master the impact of the holiday on regular passenger ratio. The autocorrelation and partial autocorrelation functions are used to analyze the stationary and periodic feature of eliminating the data sequence of trend term item and holiday factor in order to eliminate the periodic characteristic influence. Finally, the combined prediction model based on dummy variable linear regression and the seasonal ARIMA is established to revise the original seasonal ARIMA. According to the practical experiment of the regular passenger ratio data of the rail transit in Beijing in 56 weeks from March 2, 2015 to March 27, 2016, the result shows that the accuracy of the combined prediction model established in this article is higher than the original seasonal ARIMA model.

Keywords: rail transit, regular passenger ratio, dummy variables, regression model, revised seasonal ARIMA model

Evaluation Method of Color Durability for Colored Asphalt Pavement ... Xing Lei, Lei Boling, Chen Zhongda (133)

Abstract: Based on the analysis of color durability for colored asphalt and colored asphalt mixture, a comprehensive evaluation index PCD about color durability of colored asphalt pavement is put forward in this paper. Hereby, the three-layer evaluation index system of "1+2+5" is established to divide the weight value for each subitem index. The test detecting method, calculation method and control standard for comprehensive evaluation index and subitem index are proposed to provide the theoretical basis for evaluating the color durability of colored asphalt pavement.

Keywords: road engineering, colored asphalt pavement, color durability, evaluation index

Simulation of Influences of Different Web Embedding Modes on Modeling Accuracy of Corrugated Steel Web Composite Box Girder Liu Huan (137)

Abstract: In order to study the simulation of the influences of the different web embedding modes on the modeling accuracy and efficiency of the corrugated steel web composite box girder, the ANSYS is used to establish three connection modes of finite element models to analyze the deflections, stresses, shear lag effects and natural vibration frequencies under the load action. The finite element simulation results are compared with the actual data of field model test to find the most actual connection mode. The result shows that the modeling efficiency of MPC mode is obviously higher than the common node mode and the embedding mode, and can satisfy the accuracy requirements. The MPC mode is the optimal mode for the embedding connection of webs. This study can provide a reference for the finite element simulation of the composite box girder with corrugated steel webs.

Keywords: corrugated steel web, shear connector, finite element simulation, experimental comparison

Study on Prestressing Loss of Long-span PC Box Girder Bridge Wang Jian, Ma Zhongwen (140)

Abstract: The prestressed concrete box girder is widely used in the modern long-span bridge structure due to its good overall structural stress performance. However up to now, the problems of cracking and excessive torsion of box beam under service commonly exist in the built concrete box bridge. The insufficient estimation of prestressing loss in the practical concrete box beam bridge is one of its possible causes. Combined with the construction and operation of a long-span prestressed concrete box girder bridge, the exact response of box girder bridge in the natural environment is tested under the action of longitudinal prestressing loss, various test data are analyzed in detail, and some valuable conclusions are achieved, which can be referred for the analysis of prestressing loss of practical box girder bridge.

Keywords: prestressing concrete, box girder, longitudinal prestressing, prestressing loss, long-term test and analysis

Study on Protective Monitoring Technology of Combined Sewage Box Culvert

..... Gu Chuan, Wang Minhua, Liu Yunpeng (145)

Abstract: The combined sewage box culvert is to discharge the urban sewage out. It is very important to guarantee its safe operation. The development of underground space in the urbanization process is inevitable to have adverse effects on existing urban infrastructure. It is a subject worthy of study how to protectively monitor the existing sewage box culvert in the new engineering constructions, and make sure to find the problems and to issue the early warning in order to guarantee no larger loss. Taking a more typical practical engineering project as an example, the article describes how to protectively monitor the existing combined sewage pipeline box culvert in the underground engineering construction of an adjacent project. The relative experience can be referred for the similar projects.

Keywords: protective monitoring, combined sewage box culvert, layout of monitoring point, warning value, monitoring frequency

Analysis of Emulsifier Influence on Performance of Emulsified Asphalt Wang Shengzhong (149)

Abstract: The different cation emulsifiers CH-R, GY-2 and MQ-S are used to prepare the different emulsified asphalts by changing their dosages in order to test and study the emulsion emulsifying effect, standard viscosity and evaporation residue performance. The result shows that the emulsifying effect of emulsified asphalt is better and the corresponding performance of emulsified asphalt more excellent when the usage of CH-R emulsifier is 0.8% and the usage of GY-2 emulsifier is 0.3%. At the time, the adhesion experiments of the different emulsified asphalts and the different aggregates are implemented. The test results

show that the emulsion breaking speed and concretion speed of emulsified asphalt by the alkalinity aggregates are obviously speeded up. The cohesive force between aggregate and asphalt is stronger, and the slurry mixture has the good integrated flexibility.

Keywords: emulsified asphalt, emulsifier, evaporation residue, performance index

Study on Safety Evaluation of Tunnel in Diversion Project from Datong River to Qinwangchuan Basin

..... Jin Chunling (152)

Abstract: According to the survey results of the projects, 31 pressure – state – response (PSR) indexes affecting the tunnel safety are selected by PSR model, and the analytic hierarchy process is used to determine the weight of each PSR index. The safety state of diversion tunnel is divided into five levels in order to comprehensively evaluate the safety state at the diversion tunnel. Finally based on the relative analysis result of PSR index, five main factors affecting the safe operation of diversion tunnel are determined.

Keywords: diversion project from Datong River to Qinwangchuan Basin, diversion tunnel, PSR model, AHP, safety evaluation

APPLICATION OF ACHIEVEMENTS

Application of New Half–open Fermentation Tank Technology in Sludge Disposal in Urban Area of Suzhou

..... Han Suhua, Qiu Yunlong, Shen Hao, Dong Xiaolei (155)

Abstract: The sewage in the urban areas of Suzhou and Changshu is basically domestic sewage. Combined with the sludge quality and the local practical condition, and according to the design principle of reduction, harmlessness, stabilization and resource, the new half–open fermentation tank technology is used for the sludge treatment of Suzhou, and the auxiliary material is the greening waste of garden. The sludge product is produced as the organic fertilizer and matrix soil used for the landscaping, which realizes the safe disposal and resource utilization of sludge.

Keywords: sludge disposal, resource, half–open fermentation tank

THE RELATIVE SPECIALITIES

Preliminary Discussion and Analysis of Magnetic Levitation Protection Scheme in Municipal Engineering

..... Wang Wenjuan (158)

Abstract: The maglev line of Shanghai is the first high–speed maglev line really put into commercial operation in

the world. In the recent years, with the construction development of municipal engineering, many municipal engineering projects conflict with the magnetic levitation facilities in the implementation process. It is very important to take the reasonable protection measures for the relative magnetic levitation facilities in order to ensure the normal implementation of municipal projects and the safety of magnetic levitation operation. According to Shanghai Lingkong Road – Yingbin Avenue Interchange Reconstruction Project, the article preliminarily discusses some common magnetic levitation protection schemes for the project, gives the targeted protection scheme suitable for the characteristics of the project, and introduces the relative checking calculation and estimation, which can be referred for the similar projects.

Keywords: municipal engineering, magnetic levitation, cable trench, protection scheme, estimation

Effect of a Big Hole in a Key Node of Utility Tunnel on Stressing Property of Structure Tang Tiantian (161)

Abstract: According to the analysis and comparison of 3D model and 2D model of a key joint of a utility tunnel, the article introduces how to simplify and be more reasonable for the plane calculation model if there is a big hole in the floor, which can provide the basis for the designers.

Keywords: utility tunnel, big hole, 3D model, 2D model

Study on Layout of Vertical and Horizontal Male and Female Passenger Zones in Subway Carriage of Urban Traffic Zhu Dan, Wang Zhenpo, Qi Chaoqian, Zhang Qiming (165)

Abstract: With the rapid development of economy and society in China, the subway is becoming an important means of transportation for the residents of large cities. It is important to discover the reasonable layout of subway carriage for promoting the healthy operation of urban subway. According to the summarization of the protection methods for the female in the subways or the other public transport places in the different regions and countries, the article discusses the feasibility of setting up the male and female passenger zones in the subways of the large cities in China from the aspects of urban civilization, social security and subway transport capacity, and puts forward the layout scheme of vertical and horizontal male and female passenger zones in subway carriage of China. This scheme will effectively shorten the distance between the opposite sex passengers in the traffic peak, and increase the passenger capacity of more than 8% that will not only protect the safety of the female passengers, but also improve the traffic carrying capacity of subway.

Keywords: male and female division, spatial distance, public transport capacity

Analysis of Pit Backfilling Scheme Chu Fangping (170)

Abstract: Based on an example of pit backfilling in Sanya of Hainan, the article analyzes the backfilling from

aspects of filling source, backfilling scheme, backfilling construction method, backfilling quality control, and gives the relative conclusion, which can be referred for the design of the deep pit backfilling in the similar projects.

Keywords: pit, deep pit backfilling, earthwork balance, underwater backfilling, filling method

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新型道路预养护技术

——PRC-2000沥青路面超级抗滑封层



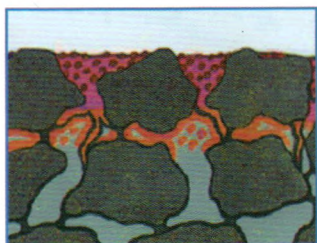
卓越性能

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

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

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