Urban Roads Bridges & Flood Control

ISS
CN 31-1602/U

城市道桥与防洪

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

5 2019 May 总第241期

万方数据-数字化期刊群 全文收录
清华同方-中国期刊全文数据库 全文收录
维普资讯-中文科技期刊数据库 全文收录
中国核心期刊（遴选）数据库 收录期刊
中国学术期刊综合评价数据库 统计源期刊

图为天津市市政工程设计研究总院设计的天津市第二新华中学海绵工程项目

因为我们专心，所以我们专业！
——《城市道桥与防洪》
学术联盟：上海市城市科学研究会

●本期看点

9 771009 771192 05>

中华人民共和国住房和城乡建设部优秀期刊

中华人民共和国住房和城乡建设部优秀期刊

城市道桥与防洪（月刊）

CHENGSHI DAOQIAO YU FANGHONG

2019年 第5期(总第241期)
2019年5月15日出版

1984年创刊

主管：中华人民共和国住房和城乡建设部
主办：上海市政工程设计研究总院(集团)有限公司
协办：全国城市道路与桥梁技术情报网

出 版：《城市道桥与防洪》编辑部
总 编 辑：骆燕妮
责任编辑：叶 露 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
来稿邮箱：cdq@smedi.com
国外发行：中国国际图书贸易总公司 代号：BM 1859
排版印刷：上海商务联西印刷有限公司
地址：上海市春和路1350号7号楼

中国标准连续出版物号：ISSN 1009-7716 / CN 31-1602/U

目 次

期刊基本参数：CN 31-1602/U * 1984 * m * A4 * 340 * zh * P * ￥25.00 * 10000 * 90 * 2019-05

广告索引

封面工程

本期封面工程为天津市第二新华中学海绵工程项目,由天津市市政工程设计研究总院设计。

第二新华中学位于国家海绵城市试点区——解放南路试点片区内,是天津市海绵城市建设的样板项目,也是天津市第一个将海绵城市建设理念贯穿于整个项目的规划、设计和施工各个阶段的公建项目。

项目建设理念先进,涉及的低影响措施齐全,完善度较高,是2019年住建部海绵城市建设验收的重点项目。通过对校区雨水排水分区进行合理划分,对雨水产汇流特点进行梳理,优化了海绵设施空间布局,完成了整个片区径流总量控制率78%和径流污染控制率65%的目标,基本达到了"小雨不积水,大雨不内涝,水体不黑臭,热岛有缓解"的建设目的。

在此基础上,学校以"海绵校园"为环境育人载体,尝试成立"海绵校园研究兴趣小组",学习海绵理念,通过与项目咨询单位天津市市政工程设计研究总院合作,开展兴趣研究,力争让每一位新华的孩子都能知海绵、懂环保,为将来海绵城市建设及人与自然的和谐发展做出自己的努力。

Urban Roads, Bridges & Flood Control
(Monthly)
Number 5, 2019(Total Number 241)

CONTENTS

ROADS & COMMUNICATION

Abstract: The setup of overpass / underpass of the main line is a common means to alleviate the contradiction between the traffic supply and demand of urban road nodes. The main influencing factors on the overpass / underpass lane scale are analyzed. Based on an actual case, the paper restricts the land condition of road, sets up the different overpass / underpass lane scale schemes of the main line and the traffic demands, carries out the traffic simulation to analyze the traffic adaptabilities of the different lane scales, and gives the relative advices for the relevant practitioners and decision makers.

Keywords: overpass / underpass of node, limited land, lane scale, traffic adaptability, traffic simulation

Abstract: The rail transit route passes through the urban center area, and the layout of its stations is diversified. The station construction has a great influence on the urban road traffic. Taking the stations along the Changzhou Rail Transit Line 1 as an example, this paper sets forth the layout principle of relieved road, the mode of traffic organization by stages, the traffic guidance of the surrounding roads, and the design of road structure. The actual operation effect is good after the completion of the relieved road, and ensures the smooth and orderly urban traffic during the construction of rail transit.

Keywords: rail transit, relieved road, design

Abstract: This paper introduces the theoretical basis of construction form of the urban trunk road jointed board of main and auxiliary roads, analyzes its functional characteristics, applicable conditions, construction scale and design thinking, sets forth the design emphasis on this kind of road – the design of entrance and exit of main and auxiliary roads, and the design of traffic organization of intersection, and finally analyzes the

Abstract: Dalian Bay Subsea Tunnel is the expressway to connect the south and the north bank of the bay in the core area of Dalian, and is also an expressway into and outside of the core area. The connection interchange on its south bank is the hub to realize the traffic transformation of the newly built expressway and the road network in the old urban area of Zhongshan District, and will undertake the traffic transformation function of the extension line (expressway) of Shugang Road in the future. This paper comprehensively analyzes the functional orientation of the project, the planning condition of the south bank, the traffic demand and the surrounding construction conditions. On the basis of traffic organization design, this paper introduces the recommended overall scheme of interchange. Based on the combination of the short term and the long term in the scheme, the traffic organizational strategy of "two-stage turnoff, three-way separation" is proposed in the short term, and the three-point collecting and distributing deformed Y-shaped underground interchange is recommended to connect the surrounding road network. Combined with Shugang Road Extension Project, the dicotyledon-shaped ground interchange will be added in the long term to realize the interchange between two expressways.

Keywords: subsea tunnel, connection interchange, planning of road network, expressway, Dalian Bay

Abstract: The Xian South Taibai Road, East Zhangba Road and Urban Ring Expressway Combined Interchange is an important node in the expressway system of Xian. This paper introduces the project background, construction conditions, restriction factors and main technical standards, and studies the design scheme of the interchange on the basis of traffic flow prediction and construction scale analysis, and project design scheme, which lay the foundation for the later design and implementation of this interchange.

Keywords: urban ring expressway, combined interchange, restriction factor, prediction of traffic flow, overall layout scheme

Abstract: Aiming at more and more crossing situation of multiple expressway network, this paper discusses the multiple traffic functions of interchange designed under the condition of dense road network and limited land, and analyzes the interchange function, road network structure and traffic volume of Shenzhen Yangangdong Interchange Project. Combined with the present boundary conditions of site, the underground pipe network, the surrounding buildings and the environmental landscape, this paper carries out the qualitative and quantitative analysis, and selects the suitable interchange type to make the design not only meet the

Abstract: At present, in order to improve the driving condition and reduce the noise pollution, the cement concrete pavement (named as the white pavement) is been reconstructing into the asphalt concrete pavement (named as the black pavement) step by step in Shanghai. Before reconstruction, the management and maintenance units are required to master the technical condition of old road, and accordingly adopt the relevant reconstruction scheme. This paper introduces the contents and methods of old road technical condition detection. The application example of the "white to black" in the engineering explains its feasibility and significance.

Keywords: "white to black", reconstruction engineering, old road detection, resonance broken, significance

BRIDGES & STRUCTURES

Abstract: Jinan Yellow River Highway-Railway Bridge is a public bridge for the Shijiazhuang – Jinan Passenger Railway Line Project, the Handan – Changzhi and Handan – Jinan Railway Expansion Reconstruction Project, and the Jinan City "North Spaning" Urban Spatial Development Northward Cross-river Channel. Relying on the construction of Yellow River Bridge for Shijiazhuang – Jinan Passenger Railway Line, this paper discusses the overall construction scheme of location selection, type selection, bridge structure, construction scheme and inspection monitoring in operation period of the large-sized cross-river highway-railway bridge.

Keywords: highway-railway bridge, selection of bridge type, construction scheme

Abstract: In order to open up the vital communication line between Changxing Island and Jiaoliu Island in the Dalian Changxing Island Economic Zone, to promote the connection among the Changxing Island Economic Zone and the islands in the Xizhong Island Petrochemical Zone, to achieve the resource complementarity, benefit sharing and construction synchronization, and to solve the traffic dilemma where the distance is no more than 1 km but only across the ocean, the construction of a cross-sea bridge between Changxing Island and Jiaoliu Island is proposed, and the corresponding scheme is designed. The construction of rapid, safe and convenient transportation can promote the further development of the Dalian Changxing Island Economic Zone.

Keywords: bridge engineering, cross-sea bridge, urban trunk road, Changxing Island

Abstract: Xicungang Cross-sea Bridge in Beihai City spans the water area of Xicungang. The total length of this bridge is 1.78 km, in which the main bridge is a double-pylon double-plane composite beam cable-stayed bridge. Its span is arranged by 455.8 m (38.9 m+70 m+238 m+70 m+38.9 m). This paper introduces the scheme design, overall layout and calculation contents of the main bridge, which can be referred for the similar bridges. The calculation result shows that the structural stiffness is high, and various steel structural stresses are less than the standard limits, the deck slab meets the requirements of Class B pre-stressed concrete and the integral stability coefficient has the greater safety, which all meet the standard requirements.

Keywords: overall design, cable-stayed bridge, composite beam

Abstract: The main bridge of Xinlibao Bridge in Shenyang is a 370-m (47 m+80 m+116 m+80 m+47 m) pre-stressed concrete continuous box beam bridge. Its approach bridge is a 35-m span pre-stressed concrete continuous box beam bridge. This paper introduces the overall design of this bridge.

Keywords: pre-stressed concrete, box beam bridge, overall design

Abstract: Taking Rule Lake Bridge as the engineering background, this paper introduces the comparison, calculation and analysis of design schemes for this bridge. This bridge is a 410-m (25 m+40 m+50 m+3 × 60 m+50 m+40 m+25 m)-span continuous beam arch composite bridge. The MIDAS Civil software is used to simulate and analyze the V-support arch foot of this bridge. The significant conclusion is achieved. Based on the calculation result, the arch rib of this bridge has the sufficient security under the design load effect, and has a certain capacity of bearing the overload.

Keywords: arch and beam combination, bridge design, structure analysis

Abstract: In the comparison stage of engineering scheme for a project, the economical efficiencies and stress performances of a corrugated steel web PC composite beam bridge and a traditional PC box-beam bridge are compared. The corrugated steel web PC composite beam bridge can greatly decrease the usage of bridge concrete, save the cost and fully play the performance advantages of two materials. This kind of material has been applied in this project.

experience of the built curved bridges and combined with the comparison of economy, this paper determines the standard span, preliminary structure and reinforcement. According to the calculation and comparison of single-beam model, beam grillage model and solid model, this paper analyzes the counter force of support, the uneven stresses at the inside and outside, and the horizontal force of support in order to provide the basis for the fine design. The anti-overturning and anti-bending shear checking calculations are carried out according to the new standards. The engineering experience provides the reference for the design of structures.

Keywords: small-radius curved bridge, beam grillage model, solid model, fine design

Abstract: Combined with an engineering example, this paper analyzes the mechanical characteristics of curve beam bridge and its influence. The results show that the reasonable setup of support form can improve the mechanical performance of concrete curve bridges and optimize the design of the bridge.

Keywords: bending-torsional coupling, curve beam bridge, bearing spacing, bearing eccentricity, bending radius

Abstract: Taking an interchange in the ring expressway of Baoshan City as an example, the finite element analysis model is established by MIDAS Civil software to calculate and analyze the continuous steel box girder structure of an interchange in detail. The checking calculation and analysis of the longitudinal, lateral and support stiffening ribs, the stiffness and the overturning resistance can achieve the conclusion that various indexes all meet the standard requirements. The analysis can provide reference for the design of other similar bridges.

Keywords: interchange, steel box girder, continuous beam, finite element analysis

Abstract: For the single-pedestal pier continuous box girder bridge, the anti-overturning stability coefficient is usually used as the index to evaluate the anti-overturning capacity of bridge. The anti-overturning stability coefficients have two different definitions. The stability coefficient calculated by the different definition is not the same. The limit overturning live loads of the single-pedestal pier continuous box girder are separately achieved through the two different definitions of anti-overturning stability capacity, which can be referred for the evaluation of anti-overturning security of the same bridge structure.

Abstract: The tension of the closure steel cable of crossbeam will make the longitudinal beam produce an out-of-plane bending moment because of the crossbeam and longitudinal beam of the ultra-wide bowstring arch bridge respectively prefabricated and hoisted, which will affect the stress of longitudinal beam and cause the difference between the intermediate position stress and the edge position stress at the same section height of the longitudinal beam. This difference is likely to make the calculation of longitudinal beam become a key control node for the calculation of bridge structure. In order to seek a better solution and avoid blindly increasing the section or steel bundle, which will cause a waste of resources, this paper tests several construction procedures from the viewpoint of crossbeam construction procedure according to the background of the new construction project of Huanyang Bridge in Huzhou Economic Development Zone, and tries to find out the most favorable construction procedure of the longitudinal beam stress as the final crossbeam erection sequence of the project, to maximize the reduction of the above stress differences and to achieve the goal of structural design economy and stress rationality.

Keywords: bowstring arch, super-wide, long span, crossbeam erection, longitudinal beam stress

Abstract: Taking an urban 97.8 m-span half through special-shaped steel structure arched cross-river bridge as an example, this paper introduces the design technical standard, structural design, construction process, structure calculation and other contents of this bridge, separately introduces the arch ring, main girder, suspender and substructure in the aspect of structure design, and analyzes the calculation model, permanent design state and seismic design situation in detail. This bridge completely shows the abundant spatial dimension and the flexible curve form with the good landscape effect. The structure calculation and optimization design have the appropriate reliability and better economy.

Keywords: special-shaped, steel structure, arch bridge

Abstract: MIDAS/Civil analysis software is used to establish the finite element model of a steel structure bowstring arch bridge. A scheme for the static load of steel structure bowstring arch bridge is formulated. The test section, measuring point, loading position, loading condition and loading weight are determined. The stress and deflection of each test section are tested and analyzed under the static load, and compared with the theoretical value so as to know whether or not the practical working state of bridge structure meets the design requirements under the test load.

Abstract: The horizontal structure in the reverse construction method is required to meet the requirements of bearing capacity and deformation in the construction stage and service stage at the same time. The horizontal structure is in the double-way stress state of horizontal pressure stress and vertical bending stress in the construction stage. And considering the factors of excavated outlet, altitude difference and different construction methods, its stress state is extremely complex. For a long time, the horizontal structure in the reverse construction method is all analyzed through the engineering experience, which is bad for the projects. This paper analyzes the distribution of internal force of excavated hole-side beam very concerned in a project, and introduces the practical internal force calculation formula of hole-side beam.

Keywords: deep foundation pit, reverse construction method, hole-side beam

Abstract: Taking a 13-span corrugated steel web continuous girder bridge as an example, this paper studies two key mechanical issues of temperature effect and stress state in the cast-in-cantilever construction process of corrugated steel web composite box girder bridge by the practical monitoring method and the finite element numerical simulation method. The study result shows that the atmosphere temperature change can cause the girder body to produce the non-neglectful displacement in the cast-in-cantilever construction process of corrugated steel web composite box girder bridge. The longitudinal normal stress of concrete top slab and baseplate presents the uneven distribution in the construction process, but the shear stress of web is evenly distributed and is not basically affected by the pre-stressing application.

Keywords: corrugated steel web composite box girder, cantilever construction, temperature effect, shearing force lag

Abstract: Loujiang River Bridge is a (83+145+83)-m three-span variable cross-section pre-stressed concrete continuous box-girder bridge on the waterway of Loujiang River. It has the characteristics of large-span small-radius variable width structure. The conventional construction schemes are difficult and risky. In this project, the segment cantilever pouring construction of form traveler is adopted for the middle span and the bracket segment cast-in-place construction is adopted for the edge span, which successfully solves the of design and construction problems of long-span small-radius variable-width three-span variable cross-section pre-stressed concrete continuous girder bridge under the continuous navigation conditions. It is

FLOOD CONTROL & DRAINAGE

Abstract: The design standard and design method of the relevant drainage project in the airport construction will directly influence the safety operation of airport. Combined with the construction of Shanghai Pudong International Airport Phase III Project, this paper sets forth the partition of rainwater drainage system and sewage drainage system, the reasonable utilization of regulating space of drainage channel of rainwater drainage system, the reduction of design scale of rainwater pumping station and the reasonable design of sewage pumping station in detail. The engineering scheme not only reduces the engineering scale, but also improves the environmental benefit and social benefit of the project.

Keywords: airport engineering, rainwater pumping station, sewage pumping station, design scheme

Abstract: The design idea of "sponge city" is integrated into the design of sewage pumping station. Taking a sewage pumping station project as an example, this paper introduces the setup of low-impact development facility – low elevation greenbelt and permeable pavement in order to meet the requirement of annual runoff control rate and annual runoff pollution control rate in the project, which provide the reference for the "sponge city" design idea to be applied in the similar projects of sewage pumping station.

Keywords: sewage pumping station, sponge city, low-impact development, annual runoff control rate, annual runoff pollution control rate

Abstract: Aiming at the complex characteristics of river regime change in the mountain river, and taking the design of Beixi City Area River Flood Control Project as an example, the HEC-RAS software is used to establish one-dimensional hydrodynamic model for the simulation of the measured terrain in the mountainous area and the flood flow profile under the condition of water buildings existing along the river. The original flood control projects are rechecked, the optimization design measures are proposed and the river flood discharging capacity is improved, which provide a basis for the design of flood control projects of mountain river with the complex section form.

Keywords: HEC-RAS model, flood control engineering, flow profile, mountain river

Abstract: The baseplate of sluice wing wall for a project is located in the mucky silty clay layer. After calculation, the bearing capacity of subgrade for retaining wall, the overall stability safety coefficient and the base stress ratio do not meet the standard requirements. Three subgrade treatment schemes of

cement-soil mixing pile, precast pile and cast-in-place pile are compared. The referenced standard shows that the current national standard and the local standard of Zhejiang Province have not explicitly given the calculation method of shear strength indexes of the composite subgrade after the treatment of cement-soil mixing pile. Therefore, based on the related data, the cement-soil sticky cohesion 100 kPa and the internal friction angle 200 are taken for calculation. The selection of cement-soil mixing pile scheme can improve the subgrade soil quality and can make the subgrade bearing capacity and integral stability meet the requirements. But the base stress ratio of retaining wall could not be substantially solved. After the comparison of structures, the selection of precast pile and cast-in-place pile schemes are all feasible. According to the comprehensive consideration from the construction time, cost and construction quality, the front sheet pile and rear square pile treatment scheme of precast pile is adopted for the retaining wall, which can be referred for the design of the similar projects.

Keywords: soft soil subgrade, sluice wing wall, cement-soil mixing pile, precast pile, cast-in-place pile

MANAGEMENT & CONSTRUCITON

Abstract: Taking a high-fill subgrade filling of Songkun Road (K18 + 900 – K19 + 800) as an example, this paper analyzes the first-phase preparations and technical control essentials of soil-stone filling construction, which can be referred for the construction management of soil-stone filling subgrade.

Keywords: soil-stone filling, impact rolling compaction, high fill

Abstract: In the design of the road "white to black" overhaul regulation engineering project based on the construction requirements, there are often the situations of the cement concrete pavement in the good condition and the structural strength meeting the requirement. At this moment, according to the road maintenance technical specification and standards, it is hard to determine whether this road should be converted from white to black. In order to improve the rationality of the "white to black" regulation scheme used in this kind of project design, this paper puts forward this concept of "road environmental index" selectively to be introduced into the analysis and evaluation of pavement condition.

Keywords: cement concrete pavement, "white to black", rationality of regulation scheme, pavement condition index, pavement structural strength index, "road environment index"

Abstract: The life security protection engineering of highway has been carried out in various regions, improved the security level of highway, strengthened the security basis of highway and perfected the traffic security environment of highway. However, there is a relative lack of study on how to select the facilities for the life security protection engineering especially from the economic viewpoint. Taking the G312 Wuxi Section as an example, this paper sets forth the selection principle of traffic security facilities, and carries out the economic and quantitative analysis on two facilities of traffic sign reflective film and road traffic marking, which provide a theoretical basis for the implementation of highway life security protection engineering.

Keywords: highway, security, life security protection engineering, traffic security facilities, economic analysis

Abstract: Maogang Bridge is a three-span Variable-height Steel-concrete Composite Continuous Beam Bridge. Its total length is 265 m. The cast-in-place pile is used for this bridge. The diameter of pile foundation is 1.2 m. The pile length is 64 m. In order to improve the quality of finished pile foundation, the excellent standard is proposed on the basis of standard requirements. According to the statistical analysis of pile foundation quality, the determination of "hole diameter and "hole depth" cannot reach the excellent standard and is the crux of the low good rate of pile foundation. Four factors of "old drill", "too fast drilling speed", "reverse circulation alone not able to meet the requirements of hole cleaning" and "high sand content in situ mud" are the essential factors not up to the excellent standard. The 5W1H method is adopted to formulate the countermeasures of "updating the drill equipment in time", "controlling the drilling speed", "adopting the artificial pulping" and "increasing the sand removing machines". The quality of finished pile foundation is improved and the good rate is obviously promoted through the filed implementation and inspection.

Keywords: cast-in-place pile, quality of finished pile foundation, hole diameter, hole depth

Abstract: According to the lifting construction support system of old Yonglongyong Bridge in Foshan - Jiangmen Expressway, this paper compares and discusses the lifting schemes and support methods of bridge, introduces the stress checking calculation of support system, and defines the key control essentials of lifting construction support system.

Keywords: lifting of old bridge, support system, application analysis

Abstract: The strata in Yellow River Flooding Area are mostly deposited silt and mealy sand. The mealy sand stratum is mostly sandwiched with calcareous nodules, commonly known as the pulp stones. The spewing, jacking pressure surge and poor excavation of pipe jacking are of common occurrence in the construction of this stratum, and seriously affect the normal construction of pipe jacking. Combined with the construction of Tender Section 1 in Zhengzhou New Area Wastewater Treatment Plant External Trunk Sewer Project as a case, the effective muck modification of deposited silt and mealy sand is implemented to be convenient for the slurry transport and also for the reduction of tool wear and to improve the construction efficiency. The variation of jacking force is larger because of the thixotropic slurry in the mealy sand mixed with a large number of pulp stones in the stratum. The efficient thixotropic slurry has been developed and its anti-drag effect is better. A large number of pulp stones block the slurry draining pipe, and are deposited at the soil outlet of screw conveyor, which seriously restrict the efficiency of pipe-jacking construction. The simple crushing device has been invented to improve the transport efficiency.

Keywords: Yellow River Flooding Area, pipe jacking, muck modification, thixotropic slurry, crushing device

Abstract: This paper introduces the development situation, application scope and function mechanism of cast-in-place pile post-grouting technology. Taking Zhengzhou Ring Line III Expressway Project as an example, this paper introduces the static load test, construction technology, grouting parameter and technical requirement of this technology, and meanwhile explains its economic benefit by the engineering data. The vertical compression bearing capacity of cast-in-place pile is greatly improved after the use of pile foundation post-grouting technology. The pile length can be shortened or the pile diameter can be decreased at the same requirements of bearing capacity, which greatly reduce the engineering cost.

Keywords: post-grouting, function mechanism, grouting parameter, static load test

Abstract: This paper briefly analyzes the concrete crack cause, crack control measures, other measures taken in the design and construction, and the common treatment methods of concrete crack. Taking the crack treatment of box culvert and tunnel engineering as an example, this paper introduces the grouting treatment

Keywords: soft soil foundation, widening of old bridge, splicing, disease analysis, settlement

Abstract: Based on the investigation of the cracks in the inverted arch of Wuzi Mountain Tunnel of Tianyong Expressway, and analysis of the crack causes, this paper comprehensively considers four aspects of dewatering drainage, foundation reinforcement, lining structure strengthening and pavement reinforcement of the tunnel, and formulates the inverted arch crack treatment scheme. And the in-tunnel convergence and vault settlement deformation are monitored during the implementation of the scheme. The result shows that the tunnel inverted arch crack treatment scheme formulated according to the above four aspects is reasonable and feasible. After the tunnel is treated according to the scheme, the development of tunnel cracks is effectively inhibited, which provides a guarantee for the safe operation of the tunnel in the later stage. It also provides valuable reference materials for the formulation of the similar engineering treatment schemes.

Keywords: tunnel engineering, disease of inverted arch, treatment scheme, monitoring measurement

STUDY ON SCIENCE & TECHNOLOGY

Abstract: DOT has the characteristics of special section and relatively large excavation area. Its tunneling will cause the larger disturbance of stratum. And too large soil disturbance usually leads to a series of environmental diseases. Relying on a DOT project of metro in Shanghai, 3D elastic-plastic finite difference model is established to calculate and analyze the distribution of surface displacement field and soil mass stress field caused by DOT tunneling. The calculation result of the numerical model and the field monitoring data are compared and verified. The study results show that the transverse distribution of surface deformation caused by the DOT construction is basically in line with the normal distribution. And the influence area is mainly concentrated in the 2 times of the shield width on both sides of the axis. At the time of the incision, the surface of the earth is raised, while the rear soil mass is sinking after the shield tail leaves. The longitudinal settlement of the ground surface is stabilized gradually from 20 rings. The influence of shield tunneling on the lower soil is relatively small, the earth pressure at the bottom of the shield is the minimum and the earth pressure increment is the maximum in the upper part of the axis in shield. The study results can provide some theoretical basis and prophase guidance for the similar projects in the future.

Keywords: soft soil stratum, double-circle shield tunnel (DOT), surface settlement, earth pressure distribution, finite difference method

Abstract: Recently, the assembly technology has made great progress. It is a fire-new direction to apply the pervious concrete in the prefabricated form in the sidewalk. Based on traffic load, hoisting demand and technical economy, four experimental mixing ratios of prefabricated pervious concrete for sidewalk slabs are proposed. The basic mechanical characteristics of pervious concrete are determined by the void ratio, apparent density, compressive strength and flexural strength tests, and the strength grade of concrete is determined. The mechanical property at the most adverse position is determined through the mechanical calculation of hoisting process. Finally, the reinforcement scheme is proposed and the safety factor of concrete hoisting based on test gradation is calculated.

Keywords: precast assembled, pervious concrete, sidewalk, mechanical properties

Abstract: The train will make a huge vibration as it passes over a bridge. The vehicle-induced bridge vibration is transmitted to the bridge pier through the bearing, and then transmitted to the foundation and the surrounding environment through the pier and finally to cause the vibration pollution of environment. The ANSYS software and UM software are used to establish the vehicle-line-bridge coupled vibration system in order to carry out the vehicle-bridge coupling joint simulation. The calculation achieves the dynamic response data of beam bottom and pier at the connection of bearing when the ordinary ball bearing and the new vibration reduction ball bearing are respectively used. The results show that the vibration isolation effect is obvious when the vibration of the upper part of bridge is transmitted to the pier by using the vibration reduction ball bearing.

Keywords: vehicle-line-bridge coupled vibration, joint simulation analysis, vibration reduction bearing vibration, dynamic response, vibration reduction isolation

Abstract: As the main component bearing the upper load of construction engineering (industrial and civil construction engineering, bridge engineering), the quality of foundation pile will directly affect the overall safety and service functions. At present, the acoustic transmission method of engineering pile foundation is one of common inspection methods for the integrality of pile body, and has the preponderant characteristics for the inspection of the integrality of the pile body with the longer length and lager diameter. This inspection

Abstract: The influence of cracks on the safety performances of the 280 KJ single-slope and F-type slope reinforced concrete barriers and 520 KJ composite barriers are calculated and analyzed by the finite element simulation method. The test section of the cracked 280 KJ single-slope and F-type slope reinforced concrete barriers, and 520 KJ composite barriers, and the test section of 520 KJ fiberglass reinforced concrete barriers are set up. The real vehicle crash test is sued to further analyze the influence of cracks on the safety performance of concrete barriers. The study result shows that concrete barriers are discontinuous at the cracks, but the existence of concrete longitudinal and vertical reinforcements makes the integral safety capacity of the barriers as the longitudinal continuous structure not yet weakened. Therefore, the cracks of concrete barriers have little influence on its integral safety performance.

Keywords: crack, concrete barrier, fiberglass reinforced, safety performance, finite element simulation, real vehicle crash test

Abstract: This paper discusses the geotechnical parameters and strength performance of gravel subgrade stuffing in low filling and shallow excavation section. According to the characteristics of loose material, the ratio of additional load stress to dead weight stress of subgrade is calculated numerically based on ABAQUS finite element software. The working area depth of gravel subgrade under overload and multi-axis loading is analyzed in depth. It is found that the range of subgrade under standard axle load is 10~20 cm deeper than that under current specification, and the overload will have more adverse effect on the gravel subgrade than the change of axle shape. The modulus of subgrade has a certain effect on the depth of working area, but too large modulus has no obvious effect on improving the subgrade stress environment, but it should strictly meet the design modulus of resilience of the top surface of subgrade. This paper points out that the compactness index is not suitable for the quality control of gravel subgrade construction. From the viewpoint of ensuring the basic functions of subgrade deformation resistance and bearing capacity, a double-index control method and corresponding standards based on settlement difference of key points in subgrade cross-section and FWD linear inversion modulus are established. The dynamic inversion modulus and the static resilience modulus measured by the bearing plate are analyzed and compared. This paper puts forward the modulus correction coefficient convenient for the application in the construction of gravel subgrade.

Keywords: gravel, subgrade working area, overload, construction quality, settlement difference, FWD

Abstract: The hole sealing water stop is an important link in the construction technology of pipe curtain box culvert method. The sealing performance and the water stop effect will be related to the propulsion of pipe curtain, construction of box culvert and settlement control of surrounding stratum. Taking Tianlin Road Subway underpassing Middle Ring Line as an example, this paper sets forth the hole sealing used in this project and its action, and on this basis, introduces the design of hole sealing device and the research and development of the supporting new type of macromolecule polymer slurry in order to verify the effects of the new hole sealing device and high-performance slurry. The experimental study shows that the new type of high-performance slurry can play a better water-stop role under 0.6 MPa ambient pressure, and there is a little overflowing of slurry between the pipe curtain. This experimental study can be referred for the hole sealing construction in the soft soil stratum, and also prove the feasibility of hole sealing water stop device by the pipe curtain box culvert construction method used in the deeper soil stratum.

Keywords: pipe curtain box culvert method, hole sealing device, water-stop performance, new type of macromolecule slurry

APPLICATION OF ACHIEVEMENTS

Abstract: With the wider and wider application of the full-enclosed acoustic barrier in the urban rail transit projects, how to reasonably design the main structure type of full-enclosed acoustic barrier is very important. The wind tunnel experiment is the mainstream test to measure the effect of piston wind resistance for the main structure of acoustic barrier in recent years, and the CFD simulation technology is the theoretical basis for the wind tunnel experiment.

Keywords: CFD simulation technology, rail transit, full-enclosed acoustic barrier

Abstract: The traditional municipal surveying method has been hard to meet the working demand of the current social municipal encryption survey in the roadbed and pavement construction because of its low work efficiency and many constraints. The modern surveying and mapping technology guarantees the accuracy of municipal engineering surveying work to some extent and provides the elevation requirements in real time, and solves the defect of the traditional municipal engineering survey hard to provide the coordinate and elevation in

THE RELATIVE SPECIALITIES

Abstract: In order to solve the contradiction of metro station construction and urban traffic congestion, the pipe-jacking method is adopted in the area under the section of Middle Yanan Road at Jingan Temple Station of Shanghai Metro Line 14. This paper introduces the structural design scheme of the large-section pipe-jacking working shaft at Jingan Temple Station. The composite wall-type frame system of construction supporting beam and temporary concrete diagonal bracing is adopted to carry out the level underpinning of headwall structure in order to solve the contradiction of unable combination and setup of the level frame beam in construction stage and the floor slab in service stage. And 3D finite element analysis is adopted for the verification.

Keywords: pipe-jacking working shaft, buttress column, construction supporting beam, underpinning, finite element analysis

Abstract: This paper firstly analyzes the theoretical basis of anti-floating checking calculation of underground tunnel from the viewpoint of anti-floating calculation theory, then summarizes the anti-floating checking calculation steps from the theoretical basis,and finally analyzes an example of the anti-floating checking calculation of Guimiao Road Tunnel in Nanshan District of Shenzhen to achieve the calculation methods commonly used in the practical projects, which provide the corresponding reference for the checking calculation of the anti-floating stability of the relative urban underground tunnels.

Keywords: underground tunnel, underground load, anti-floating, anti-floating pile

Abstract: Through the analysis on the vertical force generated by vehicle load under the different overburden conditions, the calculation method of equivalent force of the vehicle load in underground structure is clarified. By analyzing the mechanism of the horizontal force exerted by vehicle load on the underground retaining structure, the value of vehicle load in underground retaining structure is discussed.

Keywords: underground structure, vehicle load, vertical force, horizontal force

Abstract: Taking Changzhou as an example, this paper further analyzes the demand of its pipelines into the utility tunnel from the present situation of the municipal pipeline system in Changzhou, and uses the multifactor superposition method reasonably to determine the layout system of urban utility tunnel in

Abstract: Several different ageing modes are used to age the high-viscosity SBS modified asphalt, and the fluorescence microscope technology is used to compare and analyze the asphalt specimens before and after aged. A series of related microscopic parameters are achieved by the images after MATLAB and image-pro plus processing calculation. The loss ratio of SBS after the short-term aging is 77.7% (RTFOT) and 69.8% (TFOT) respectively, and the loss ratio of SBS after the long-term aging is 84.7% (RTFOT+PAV) and 85% (TFOT+PAV) respectively. At the same time, this paper compares and studies the macroscopic indexes of high-viscosity SBS modified asphalt. The macroscopic performances of high-viscosity SBS modified asphalt will be obviously different by two aging modes of TFOT and RTFOT. The aging degree of the asphalt by RTFOT aging mode is higher than TFPT. This kind of difference still remains after the long-term aging.

Keywords: high-viscosity SBS modified asphalt, aging, fluorescence microscope, SBS phase area ratio, macroscopic index

Abstract: The collapsible loess is widely distributed in the northwest regions of China. As a kind of special soil, it is prone to strength failure under the influence of external load and rainfall. In view of this, taking a sliding slope of loess foundation pit in Lanzhou as an example, this paper introduces the application of the treatment measures of brushing slope + solid steel pipe pile + soil nail, and verifies the rationality of this reinforcement measures through the numerical simulation method. The results can provide the effective reference experience for the treatment of the similar engineering slopes in the similar areas.

Keywords: collapsible loess, foundation pit, sliding slope, treatment measures

Abstract: The calculation of generating capacity of the photovoltaic (PV) system is the important basis to design and optimize the photovoltaic system. But there are many problems in the traditional method of PV system capacity calculation. In order to solve the problems, this paper analyzes the feasibility of PVsyst software for calculation and puts forward the solution of calculation through the PVsyst software.

Keywords: photovoltaic system, generating capacity, PVsyst

Abstract: In order to upgrade the public green space construction level of Zhangjiang Science City, the refined management objective is achieved. From the design, construction and maintenance of three dimensions of standardization, and cooperated with the management system of landscape standardization, the exploration and practice of landscape standardization can make the landscape standardization implemented. Finally, this paper summarizes a set of public green space engineering management method suitable for Zhangjiang Science City.

Keywords: Zhangjiang Science City, landscape standardization, green space grading system, practice and application, management system

Excellent Journal of the Ministry of Housing and Urban-Rural Development of PRC

Urban Roads, Bridges & Flood Control

Monthly

Number 5, 2019 (Total Number 241)

Publication on May 15th, 2019

Start publication in 1984 Scope of issue: Issue at home and abroad

Department responsible for the work: the Construction Ministry in PRC

Sponsor: Shanghai Municipal Engineering Design & Research Institute

Editor & issue: Editorial department of "Urban Roads, Bridges & Flood Control"

Editor-in-chief: Luo Yanni

Address: No.901 Zhongshan Bei Er Road, Shanghai

P.C.: 200092 Tel.: (021)55008850

Fax: (021)55008850

E-mail: cdq@smedi.com

ISSN 1009-7716

CN 31-1602/U

Domestic price: 25 yuan RMB

Journal of Municipal Engineering Branch of China Society of Civil Engineering and Municipal Design Branch of China Society of Prospecting Design

ISSN 1009-7716
CN 31-1602/U
万方数据
国外发行代号： BM1859
定价： 25.00 元