Urban Roads Bridges & Flood Control

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城市道桥与防洪

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——《城市道桥与防洪》

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● 本期看点

中华人民共和国住房和城乡建设部优秀期刊

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防洪排水

管理施工

编委成员单位(排列不分前后)

广告索引

封面工程

本期封面工程为重庆市石板坡长江大桥复线桥南桥头立交工程,由重庆市设计院设计。

该立交是由江南大道、南岸滨江路、江苑路等5条道路相交形成的组合式立交。其特点为:(1)南桥头立交中的南岸滨江路与石板坡长江大桥复线桥南引道高差达36 m,立交匝道布置受到南侧长江河工模型线的限制,北侧受到科普中心和黄葛渡水厂用地的限制,西侧用地受到海事监管楼的限制,立交用地十分有限。(2)江南大道建设时开挖南坪隧道,对于切坡后的边坡采用较缓的坡率,以利于边坡绿化和环境景观设计。

采用迂回的匝道布置方式克服了36 m高差,将立交工程建设对市科普中心、黄葛渡水厂、海事监管楼的影响降至最低。同时,利用组合式立交的特点,充分考虑了立交四周地块的交通出行需求。

该立交工程的设计时间为2003年,2006年6月通车。立交工程的交通功能完善,造型优美,具有山地城市建设特点,景观效果良好。

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CONTENTS

ROADS & COMMUNICATION

Abstract: Aiming at the characteristics of road construction with the good conditions and late-starting advantage in the new urban districts, this paper puts forward a series of new district road construction concept conforming to the systematical design of new district development planning, highlighting the regional feature, embodying the sustainability, using the four-new technology and building the excellent project in order to support the development of new urban district to be more healthy, more harmonious and sustainable.

Keywords: new urban district, road, characteristic, concept

Abstract: The highway construction is bound to destroy the natural ecological environment in the region. It is very necessary to establish an environmental impact assessment index system and apply it to highway-environment interactive design. The aggregative indicator evaluation system of soil erosion, ecosystem and its service function, and ecological environment quality is built. Combined with the practical projects, this paper quantitatively evaluates the ecological environment impact of design indexes such as bridge-tunnel ratio, filling height, roadbed width and ecological compensation of highway in mountainous areas, which provides the useful reference for the design of the other highway projects in ecological protection area.

Keywords: mountain area, highway design, ecological environmental protection, impact assessment

Abstract: This paper summarizes the road construction in Xi'an International Port Area for many years and analyzes the main problems encountered in road design and the solutions. This paper mainly discusses the selection of cross-sections of roads in the whole area, the design concept of road structure, the treatment of borrow pits, the use of building waste and the treatment of collapsible loess in order to provide reference for

Abstract: In order to solve the problems existing in the engineering design of the small-spacing interchange formed by adding the interchange in the present expressway, and based on the design principle to guarantee the traffic safety, to satisfy the traffic functions and to decrease the engineering cost, this paper puts forward the design elements for attention in the engineering design of adding the small-spacing interchange from the traffic analysis, overall design, widening design and etc. to make the design scheme of adding the small-spacing interchange group achieve the effects of safety, function and economy. The proposed design idea, design elements and solving scheme for the existing problems can be referred for the design of the similar projects.

Keywords: additional construction of interchange, small-spacing interchange, widening design, reconstruction and extension of highway

Abstract: The calculation method of longitudinal slope at the starting point of interchange ramp is not specified in the design code of China. Therefore, taking the A Ramp of Yihuang Highway Interchange as an example, and selecting the spacing 1 m and 5 m, the longitudinal slope at the starting point of the ramp is calculated by the instantaneous longitudinal slope method. Combined with the actual project, the calculation and analysis of the longitudinal slope at the starting point of ramp are carried out for two conditions of setting the road arch and not setting the road arch so as to provide the reference for the design of the longitudinal ramp of the interchange.

Keywords: road interchange, ramp, longitudinal slope at starting point, calculation

Abstract: Based on the problem existing in the construction of retaining wall and combined with the design documents of construction drawings, this paper analyses the places and reasons of the problems in the design. Combined with the characteristics of mountain highway, this paper summarizes the countermeasures for the fine design of retaining wall for the mountain highways.

Keywords: mountain highway, retaining wall, fine design

Abstract: After the scheme demonstration, the limestone soil is filled on the solidified soil in the further

BRIDGES & STRUCTURES

Abstract: Yibin Yanpingba Changjiang River Bridge is a 480 m-span composite beam cable-stayed bridge. Its middle span is a steel-concrete composite girder. Its side span is a pre-stressed concrete beam. The steel-concrete combined section is set up at 10.5 m of the middle span side near the cable pylon. The deck of middle span is 40 m wide with double-way six lanes. The steel-concrete composite girder is composed of main steel longitudinal girder, steel cross girder, small longitudinal beam, prefabricated deck slab and cast-in-situ deck slab. According to the analysis and study, the steel-concrete composite girder adopts the section type of steel double-box girder + concrete deck slab. The height at the outside web is 3.5 m. The height at the bridge axis is 2.9 m. The segment length is 10.5 m and 11.1 m. The closure section is 7 m long. The spacing of steel cross girder is 3.5 m and 3.7 m. The thickness of concrete deck slab is 26 cm. The thickness near the cable pylon is to 28 cm and the local thickness near the web is to 40 cm. The anchorage of cable girder adopts the steel anchor box, which is set up in the steel box girder. The space calculation result shows that the stresses of main steel longitudinal girder, concrete deck slab and steel cross girder are all controlled in the reasonable range, the maximum value of vertical deflection of main girder is -340 mm and the rigidity meets the requirements.

Keywords: Yanpingba Changjiang River Bridge, long span, cable-stayed bridge, wide deck, composite girder, design

Abstract: The detection every two years and the replacement every ten years for the stayed cable of bridge have become into practice. But the problem is that would not stayed cables be broken suddenly after replaced? When is broken? Would the broken cables damage the bridges? This paper tries to discuss the solutions.

Keywords: stayed cable of bridge, damaged, reconstruction

Abstract: This paper introduces the scheme design of the bridge landscape for Tengzhou Fenghuang Avenue Bridge in detail including the basic overview, technical indicators, regional historical and cultural background, bridge landscape design concepts and principles, and the three landscape schemes of Fenghuang Avenue Bridge, which can provide references for the landscape design of the similar bridges.

Keywords: bridge landscape, scheme design, layout of bridge type

FLOOD CONTROL & DRAINAGE

Abstract: In order to effectively solve the problems of drainage system upgrading, waterlogging disaster prevention and initial rainwater pollution control, the construction of the Suzhou Creek Deep Drainage Storage Pipeline System Project has been put on the agenda. This paper discusses the engineering overview, functional positioning, operation mode and maintenance management of this project, and discusses the problems for attention in the operation and the key points of maintenance and management. Referring the foreign experience and combined with the operation situation of drainage system in Shanghai, the scientized, systematized and informationalized operation and maintenance scheme is established.

Keywords: deep drainage storage tunnel, Suzhou Creek Deep Tunnel Project, operation and maintenance

Abstract: The treatment scale of Beihai Hongkan Wastewater Treatment Plant Upgrading Reconstruction Project is 200 000 m^3/d. Through the analysis of the current secondary effluent quality index, the influent quality and main removal index of the advanced treatment process are determined. The BAF post-denitrification biofilter technology and LHPS high efficiency inclined-tube settling tank process are adopted for the advanced treatment. The engineering design of core technology and dosing part of the advanced treatment is introduced in detail, and the selection of external carbon source is analyzed. The relevant experience can be used as reference for the similar projects.

Keywords: post-denitrification biofilter, high-efficiency inclined-tube settling tank, external carbon source

Abstract: The present water system of Rule Lake New Town is hard to meet the planning orientation and construction demand of Ganjiang New District, and is also more difficult to meet the sustainable development requirements of ecological environment. This paper sorts out the water system of Rule Lake New Town again and adjusts its planning from the viewpoints of water safety, water environment and water ecology, and puts forward the new treatment thought of the people oriented and the harmonious development of human and nature.

Keywords: Rule Lake New Town, water system planning, flood control and waterlogging drainage, water environment treatment, water ecological protection

Abstract: In order to provide the design wave elements and study the wave situation of Chongming Ecological Island Seawall Upgrading Project, and considering the practical conditions of underwater

MANAGEMENT & CONSTRUCITON

Abstract: The dynamic modulus of roadbed can be obtained mainly by two methods of laboratory test and field detection. Aiming at the current situation of the field fast detecting technique for the dynamic modulus of roadbed, this paper completely analyzes the working principles, detecting ranges and technical characteristics of three field fast detecting methods of FWD detecting method, DCP detecting method and PFWD detecting method. The results show that the FWD detecting method is fast and widely applicable, and can better master the conditions of every pavement structure and material filling, but there are still some problems to be solved. The DCP detecting method is simple and reliable with low cost, and is still in its primary applications in China. The PFWD detecting method is portable and quick.

Keywords: roadbed engineering, dynamic modulus, FWD detecting method, DCP detecting method, PFWD detecting method

Abstract: The collapse of karst soil cave is one of the main geological hazards during the subgrade construction of karst area. Taking the collapse of karst soil cave in the intercity expressway of Songtao – Yuping of Tongren City as an example, this paper introduces the forming conditions and collapse causes of karst soil cave, analyzes the influence of subgrade construction on the collapse of soil cave, and puts forward the prevention and treatment measures for the collapse of soil cave in the construction of subgrade, which can be referred for the construction of the other subgrade projects.

Keywords: subgrade construction, karst soil cave, collapse of soil cave, prevention measures

Abstract: The slope landslip of excavation at the south bank of Wenzhou Bridge is located on the Grade 4–6 of this slope. The shallow stratum of this slope is the fully weathered or strongly weathered tuff. Its structure is loose and its intensity is low. The lower of this slope is the white weak weathered tuff. Its lithology is more complete. The thickness of the slope body in the central area of landslip is large. The water content of soil layer is high. The peripheral slip mass is thin and the water content is low. Aiming at the features of landslide mass, the overall support scheme of the miniature pile reinforcement of pre–stressed anchor cable for the central area of landslip cooperated with anchor cable frame for the slope surface, and the reinforcement of anchor rod for the surrounding area and anchor rod frame for the slope surface is selected. The limit equilibrium of given sliding surface is used to analyze and compare the different support effects. It is found that the stabilizing effect of anchor cable frame is obvious, and the overall support scheme can meet the stability requirements of the slope mass saturated with water under the condition of rainstorm.

Keywords: landslip, pre–stressed anchor cable, reinforcement treatment

Abstract: The steel arch rib will have the expansion phenomenon of tube wall in the process of concrete pouring if the design of transverse restraint of steel tube arch rib is unreasonable or the construction technology is improper. Based on the test and stress analysis of a concrete-filled steel tube arch rib appearing the external drum of steel tube in the process of concrete grouting of arch ribs, this paper puts forward some suggestions for reinforcement treatment, which can provide reference for the disease treatment and reinforcement of the similar projects.

Keywords: steel tube arch rib, concrete pouring, tube wall expansion, reinforcement treatment

Abstract: On the basis of investigation and survey information of foundation pit support structures at home and abroad, and analyzing the relationship among the different pit areas, pit depths and supporting methods, this paper summarizes the design features of pit support structures at home and abroad now in order to provide the reference for the design and construction of pit support structures in the future in China.

Keywords: foundation pit engineering, pit support structure, underground diaphragm wall

Abstract: The granite stone paving of urban square belongs to the later process of decoration engineering. In view of the characteristics that the outdoor granite paving engineering has the oversized, the shape is irregular, and many main construction units carry out the three-dimensional cross construction hard to implement the synchronous paving in the whole area of Lanzhou West Railway Station Comprehensive Transportation Hub Project Phase II, and in order to avoid the quality problems of large alignment deviation of vertical and horizontal seams, and flatness or height difference between the adjacent blocks not meeting the requirements caused by the local construction, and the risk of delayed schedule, the "zonal asynchronous" construction method is used to establish the two-stage surveying control network for the zonal fixed-point control, which can ensure the successful paving of oversized area granite station square and guarantee the realization of schedule goal and quality target.

Keywords: zonal asynchronous, construction, oversized area, square granite, paving

Abstract: The prefabrication technology of utility tunnel is a rapid green construction technology of

STUDY ON SCIENCE & TECHNOLOGY

APPLICATION OF ACHIEVEMENTS

THE RELATIVE SPECIALITIES

Abstract: Aiming at the conditions of complex surrounding status and more control factors of the three-line interchange in Jing'an Temple Station of Shanghai Metro, this paper analyzes the control factors of its roads, buildings and pipelines, and the design difficulties of interchange scheme. This paper introduces the thoughts of two design schemes, compares the advantages and disadvantages of two schemes, and gives the optimization scheme. And also this paper introduces the other long-term reserved schemes of interchange. The focus on this scheme is how to find the best three-line interchange route in the surrounding dense buildings and the limited underground space not only to ensure the long effective operation of the future three metro lines, but also having to decrease the influence on the surrounding built areas.

Keywords: rail traffic, Jing'an Temple Station, three-line interchange, comparison and selection of schemes, design difficulties, control factor, pipe jacking

Abstract: In order to guarantee the safety and durability of precast fabricated structure, it is very important to design its joints. Especially in the underground projects, the joints are the special weak position of precast fabricated structure under the combined action of water and soil pressure. Taking an underground passage project of Harbin City as the background, this paper introduces the design scheme of the joints for the underground passage, discusses the structural performance of joints for precast concrete box-culvert fabricated structure, and introduces the design of joints. After the comparison of the built underground projects, the result shows that the cost of the main structure of the precast concrete box-culvert fabricated underground passage compared with the cast-in-situ subway structure is increased, but the labor efficiency is improved, the construction period is shortened, the technical measures cost is reduced, the time is saved and the economic benefit is obvious.

Keywords: joints, precast, concrete box culvert, underground passage

Abstract: After the decades of study and practice, the technical standard system for the utility tunnel engineering has been established in China. Based on a mass of planning, design and practice, this paper sets forth the current application of technical standard system for utility tunnel separately from the viewpoints of

Keywords: cost management, engineering budget, quota

Abstract: With the development of national economy, the engineering construction projects are increasing day by day, and the project investment is also growing. At the same time, the state investment control of engineering projects has been increasingly stringent, and more and more precision is required. Combined with a tunnel project in the area of Guangdong, this paper analyzes the risk points by various methods and measures, sorts out the controversial contents possibly existing in the whole project by the strict compiling and auditing system, and purposefully puts forward the solving scheme. By communicated with the owner and the financial assessment center, the requirements of the owner for the reduction rate of financial audit of preliminary budget documents are met, which provides a useful reference for the preliminary budget compilation of the other financial audit projects.

Keywords: engineering preliminary budget, financial audit project, compilation method

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上海凯泉

上海凯泉智能一体化预制泵站助力国家海绵城市建设

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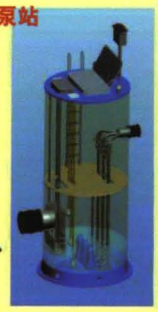

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