Urban Roads Bridges & Flood Control

ISSN 1009-7716
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

2 2016 February 总第202期

中国学术期刊综合评价数据库统计源期刊 中国期刊全文数据库全文收录期刊
“万方数据-数字化期刊群 维普资讯-中文科技期刊数据库”全文收录
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万方数据

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

2016年 第2期 （总第202期）
2016年2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
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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：上海出版印刷有限公司
地址：上海市延安东路110号5楼

中国标准连续出版物号：CN 31-1602/U
广告许可证号：3101020130030

目 次

期刊基本参数：CN 31-1602/U * 1984 * m * A4 * 196 * zh * P * ￥25.00 * 10000 * 53 * 2016-02

广告索引

Urban Roads, Bridges & Flood Control
(Monthly)
Number 2, 2016(Total Number 202)

CONTENTS

ROADS & COMMUNICATION

Abstract: With the continuous development of economy in China, the construction of urban expressways and interchanges are still growing, and there are more and more various large-sized hub interchanges. The design of hub interchange is always the difficulty in the design of road interchange, and the Ring Tangent Hub Interchange located at the ring line and radiation line is to increase the design difficulties. Beikao Interchange is at the southeast corner of Foshan Ring Line I. The Ring I, Horizontal VI and Vertical V present the tangent relationship of the ring roads. The grades and the functional orientation of its intersected roads is determined that it must have the function of large-sized hub interchange. The article analyzes the combination of the main line layout and ramp layout with the surrounding terrain features, and introduces the vertical design and the node processing of local intersected roads, and at same time sums up various problems, experience and lessons met in the selection and design of Beikao Interchange, and puts forward the proposal of the relative problems for attention in the design of the similar interchanges.

Keywords: Ring Tangent Hub Interchange, Ring Line I, Beikao Interchange, selection and design of type

Abstract: The paper reviews three development stages of urban underground roads in China, and sums up the status and studies the characteristics from three aspects of study motivation, study contents and standard criterion. From the point of effectively guiding the traffic safety operation of underground road, the paper further studies the planning, traffic volume, traffic composition, operation speed, alignment design, entrance and exit, construction method, safe operation security system, smoke and air environmental control, escape rescue and etc. of underground roads in order to make clearly the study focus of the following key technologies and improve the operation safety of urban underground road.

Keywords: urban underground road, planning, safety design, construction method, safe operation

Abstract: The article analyzes the characteristics of recurrent expressway congestion, and presents the

Abstract: The perfected road traffic infrastructure is the prerequisite condition further to develop the tourism cities. The article introduces the different characteristics of traffic composition and traffic travel of coastal road in tourism city because of its special natural geographic environment. The article sets forth how to formulate the planning suitable for the coastal roads in tourism city within the limited space of road traffic in the coastal tourism city, and uses which kind of design method, and proposes the operation strategy of coastal road.

Keywords: coastal road, planning design, tourism

Abstract: Based on the planning and combined with the present terrain, the article introduces the design of interchange scheme of the overall alignment of urban expressway. According to the forecast data of traffic flow in the early days, the main traffic flow direction is determined. Combined with the surrounding environment, the interchange type is selected and determined. The implementation proposal of long-term and short-term combination is put forward by the development order, which can be referenced for the design of the similar projects.

Keywords: urban expressway, master design, interchange

Abstract: The urban interchanges have the characteristics of limited land, complex traffic flow and many limiting factors. Based on Yichang Yiqiao Road Interchange Project, the article systematically sets forth the scheme study of urban hub interchange from the selection and optimization of construction condition, functional orientation and interchange scheme, and simulates the optimized recommended scheme by the traffic simulation method. The result shows that the traffic applicability of this interchange scheme is excellent.

Keywords: express way, urban interchange, hub interchange, control factor, scheme design, Yichang

Abstract: The urban roads within the scenic spot bear the complex functions of focusing on the special traffic demand of scenic spot besides satisfying the basic functions of road. The article completely introduces the design technical standard, the pavement structure design, the plane design, the longitudinal and crossing section designs of the roads in Longting Scenic Spot, and introduces the road accessible design, greening landscape design and lighting design in detail.

Keywords: road in scenic spot, design, landscape

Abstract: The article introduces the design data of the sunken interchanges all with the forced drainage

BRIDGES & STRUCTURES

Abstract: The single column pier ramp bridge is a type of curved beam bridge. Due to the overload of vehicle, there are many collapse accidents. The article analyzes the accident damage characteristics, and gives two kinds of damage forms, i.e. overturning instability and bearing failure. Aiming at these two kinds of damage forms, the article puts forward the corresponding solving method, and makes clearly two reinforcement measures. Taking a single column pier ramp bridge of the national highway as the background, the article introduces the space finite element analysis, and calculates the anti-overturning safety coefficient and bearing reaction under the different conditions, and the anti-overturning safety coefficient and bearing reaction distribution state after reinforced. The results of validation and analysis show that the reinforcement measures of steel bent cap are the unequivocal stress, and the simple and fast construction, which can be used for the fast reinforcement of single column pier ramp bridge.

Keywords: single column pier ramp bridge, overload, overturning instability, bearing failure, reinforcement, safety coefficient

Abstract: Taihe Bridge is newly built in Yizhuang of Beijing. The structure thickness of bridge crossing the river is limited within 80 cm because of the external conditions there. This structure of bridge is special. Based on it, the multi-span cast-in-situ pre-stressed steel reinforced concrete solid slab structure is selected. The Midas finite element software is used to carry out the modeling calculation of the main beam, and additionally to calculate and analyze the deflection, resisting shear and resisting punching, which can be referenced for the similar designs.

Keywords: pre-stressing, solid slab, special structure, Midas, design of bridge bean

Abstract: According to the National the Eleventh Five-Year Development Plan, the new airport of Kunming is determined as the relocation project, is orientated as the "large gateway hub airport facing the South Asia and the Southeast Asia, and linking up with the Eurasian, and is the core of airport layout and aviation network of Yunnan Province. The main bridge of the departure floor is the important component of the front bridge project of the terminal building of Kunming International Airport. Its characteristic is the wider bridge. The beam height is controlled by the transverse calculation. Combined with the engineering cases, the article sums up the relative experience in the design, briefly introduces the design method of wide bridge, and sets forth the general concept of structural calculation, which can provide the experience and reliable reference for the design of the similar projects.

Keywords: wide bridge, transverse distribution coefficient, calculation of plane bar system, grillage method space meter

Abstract: The continuous steel truss bridge is constructed by the cantilever assembly of midspan truss segment. The article studies the relationship of setting up the temporary pier of midspan and the stress

Keywords: submersible bridge, submersible embankment, engineering construction

FLOOD CONTROL & DRAINAGE

Abstract: To get a better flood control effect of drainage system, the article scientifically assesses the control scheme of flood prevention and safety state of the drainage system in Changqiao Area of the separated sewer system in the central area of Shanghai by using the hydraulic model of drainage system. According to the analysis of the waterlogging area, waterlogging depth and water withdrawal time of this area during the design rainfall once in a year, once in two years and once in three years, and combined with the relative factors of rainfall process intensity and pumping station operation, the article puts forward the optimization scheme of the drainage system in this area, and simulates and analyzes the flood prevention effect after the optimization and control.

Keywords: hydraulic model, drainage system, waterlogging simulation, optimization

Abstract: There are many combined sewage drainage pumping stations in the central area of Shanghai, especially along the bank of Suzhou River. The short-time water quality status is still looking blue under the condition of rainwater discharged into river at the beginning of flood season. There is no effective monitor and control. Therefore, the article sets forth the proposed study of water quality and water flow monitor system implemented for the drainage pumping stations along the bank of Suzhou River. The study work includes the master design scheme, construction contents and system function of monitoring system. The construction of this system will realize the real-time monitor of water quality and water flow discharged from the drainage pumping stations along the bank of Suzhou River, which provides the basis for the following engineering measures and the optimization of pumping station operation, and provides the basic data and technical support for the construction of the "intelligent Suzhou River" in Shanghai.

Keywords: combined sewage drainage pumping station, real-time monitor, initial rainwater, water quality and water flow

Abstract: In order to ease the increasing traffic pressure, this kind of elevated bridge is more and more used in the urban traffic system. Due to the bridge in the open state for a long time, it is to guarantee the safety and traffic capacity of vehicle on bridge, and also must ensure the rapid drainage and smooth traffic of pavement after raining. The article introduces the significance, task and mode of the drainage of the elevated bridges. The article puts forward more feasible and effective improvement measures for the design of drain outlet

MANAGEMENT & CONSTRUCITON

example, the article comprehensively assesses the management theory. The result shows that the project function is more improved than the traditional one, the whole life cost is reduced, and the risk of the owner is reduced.

Keywords: college and university, infrastructure, engineering construction, management

STUDY ON SCIENCE & TECHNOLOGY

Abstract: The construction operation side of the inner support system of pre-stressed assembled fish-bellied beam is large and its speed is fast because of its open layout mode. At the same time, the construction waste of this support is a few by reason of its cyclic utilization. This kind of support has the great development potentiality. However, there are many aspects to be further studied. Combined with the Nanjing Ring Road Tunnel Project, the article specially analyzes the stiffness of the inner support for the pre-stressed assembled fish-bellied beam, and gives the reasonable proposed value. The relative experience shows that the stiffness to support every linear meter can be 40~50 MN/m without the applied pre-stressing force. The study shows that it can be satisfied when the foundation pit is not large. The stiffness linearity of support reduces, but the bearing capacity is not changed when the span of foundation pit is larger. In order to increase the stiffness of support, it must be to increase the quantity of structural steel, but the economy is poor. The article puts forward to use and consider the pre-stressing influence of "apparent stiffness", which can better balance the stiffness and intensity of support. The engineering practice shows that it has good effect and can be used in the design of the ring road tunnel of Nanjing.

Keywords: foundation pit, fish-bellied beam, building envelope, stiffness

Abstract: Based on the theoretical model of saturated porous medium, the article considers the compressibility of solid particle and fluid, and the viscosity of pore fluid, analyzes the influence of porosity on the dynamic respond of saturated porous two-dimensional girder, and focuses analysis on the influence of porosity on the solid framework stress and fluid pressure of saturated porous two-dimensional girder, and the physical quantities of solid phase displacement and fluid displacement.

Keywords: saturated porous medium, two-dimensional girder, porosity

Abstract: To quantitatively analyze of the sensitivity of the total runoff volume and peak flow from the stormwater management model (SWMM) of an area in Shanghai to the change respond of input hydrological parameter, the modified Morris sensitivity analysis method is used to analyze the local sensitivity of the total

APPLICATION OF ACHIEVEMENTS

hydraulic model of urban waterlogging, compares the applications status, data features and application results of the different radars, points out that the application of radar data into the real time model of urban waterlogging is the inevitable development tendency to forecast the urban waterlogging and flood prevention in the future. And combined with the practical status in the large cities of China, the article puts forward some proposals for the continuous research and development of this technology in China.

Keywords: radar, C-Band, X-Band, flood prevention, urban waterlogging, real time hydraulic model

THE RELATIVE SPECIALITIES

Abstract: In order to realize the microcosmic simulation of hydrated cement based materials. The article sets forth the study status of microstructure simulation model in the hardening of cement based materials in recent years. The article comprehensively compares the characteristics, advantages and disadvantages of the continuous system models of Navi, DuCOM, HYMOSTRUC, and the digital image system model of CEMHYD3D. Limited on the difficulty in the comprehensiveness of each model in the simulation of hydration process, and based on the study objective and conditions, the reasonable model is selected in order to provide the guidance for forecasting the material performance in the engineering practice.

Keywords: cement based material, microstructure, model study, comparison

Abstract: According to the third-part measurement carried out in the recent years, the article introduces the demands, service contents and requirements of the third-part measurement in the engineering construction of China, and discusses the important role of the third-part measurement for the large-sized engineering construction. The relative experience can be referenced for the similar projects.

Keywords: three-part measurement, measurement consultant, service mode

Abstract: The ground penetrating radar is to use the electrical difference interface of electrical conductivities and dielectric constants among the mediums to detect the underground objectives for the reflection of high-frequency electromagnetic wave (frequency of tens of MHz to hundreds of MHz). The detection of underground cavity is always difficult in the engineering field. How to carry out the high-effective, large-area and non-damaged exploration is the problem many units always make great efforts to solve. With the development of electronic technique, the ground penetrating radar as a wide application range and high stability of instrument is gradually paid attention. Its expansion of application field is also the orientation the units introducing this kind of instrument make great efforts. Aiming at the high water level area of medium

field, a more reliable cavity survey technology able to widely and generally survey can be studied and will play the positive role to improve the core competitiveness and extend the market shares.

Keywords: ground penetrating radar, underground cavity, high water level of medium field

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

Urban Roads, Bridges & Flood Control

Monthly

Number 2, 2016 (Total Number 202)

Publication on February 15th, 2016

http://www.roadbridgeflood.com

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

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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

封 面 工 程

本期封面工程为，天津滨海新区中央大道海河沉管隧道项目，由天津市市政工程设计研究院设计。

该工程位于天津滨海新区，中央大道海河隧道路线全长4 132 m，其中隧道部分全长3 323 m(含暗埋段2 988 m及沉管段255 m)。穿越海河段采用沉管法施工工艺，由三节预制管段组成，管段长85 m、85 m、80 m+5 m。沉管管段断面采用双向6车道断面，全宽36.60 m，沉管段截面高度为9.65 m。隧道沉管段和两侧连接段为两孔三管廊结构，其中两孔为车行道范围，三管廊为综合管廊，用于放置过境的电力、热力、给水、通讯等综合管线。该工程设计分别获得天津市"海河杯"优秀设计市政类一等奖和中国勘察设计协会颁发的全国优秀工程勘察设计行业奖市政类一等奖。

结合工程实际，开展了一系列课题研究，包括抗震研究、基础处理研究、干坞稳定性与施工研究、岸壁保护结构稳定性与施工研究、曲线管段预制施工研究、曲线管段浮运沉放研究和超深超宽深基坑设计与施工研究等。课题研究成果达到国际领先水平，并获得天津市科技进步一等奖。

新型道路预养护技术
——PRC-2000沥青路面超级抗滑封层

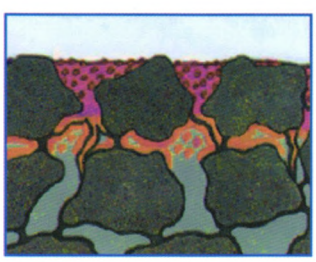
卓越性能

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30㎜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。

超级抗滑：特殊配方材料具有超强的粘结力，可以把原有路面和耐磨骨料紧紧地粘在一起而具有超强的抗滑能力。

其他：由于PRC-2000沥青路面超级抗滑封层不透水，在北方地区可大大减少（可达40%～50%）冬季向路面撒盐的用量。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ISSN 1009-7716
CN 31-1602/U
国外发行代号： BM1859
定价： 25.00 元