

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



3 2016 March 总第203期

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

全文收录
全文收录
全文收录
收录期刊
统计源期刊

图为成都市市政工程设计研究院作为
主体设计单位设计的二环快速路工程

因为我们专心,所以我们专业!

——《城市道桥与防洪》

● 本期看点

- 基于复杂城市开发背景下的公交专用道设计方案研究
- 德国城市道路Ortsdurchfahrt设计理念及其对中国的借鉴意义
- 南方某特大城市主城区排水防涝能力评估研究
- 多塔斜拉桥承受电缆融冰雪温度荷载的数值模拟方法



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3期 (总第203期)

2016年 3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

编辑委员会(第七届)

主任委员: 徐健

副主任委员: 穆祥纯 刘旭锴 靖泽文

委员: (以姓氏笔画为序)

丁心红	马国纲	王玉秀	王怀清
王磊	卢永成	李建民	李汾
李军代	刘伟杰	朱南松	朱海鹏
吴光辉	杨佩昆	陈翰新	陈德玖
童景盛	邵玉振	张澎涛	张子龙
张煜	杨斌	何拥军	和坤玲
周松国	周文波	贺志宏	姜天鹤
姜健	钟强文	骆燕妮	徐波
高中俊	贾军政	隋军	蒋乐
蒋中贵	韩振勇	赏锦国	葛以衡

出版: 《城市道桥与防洪》编辑部

总编辑: 骆燕妮

责任编辑: 叶露

编辑: 赵晓燕

美术编辑: 杨建华

英文校审: 孙宁萍

地址: 上海市中山北二路901号 邮编: 200092

电话: (021)55008850 传真: (021)55008850

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

道路交通

- 停车换乘(P+R)系统理论在北京轨道交通站点周边
停车换乘系统中的应用 牛犇, 齐赛(1)
 - 基于复杂城市开发背景下的公交专用道设计方案
研究 马生军(5)
 - 深港西部通道深圳侧接线工程下沉式道路结构
总体设计 丁兴国(9)
 - 浅析城市地下道路特点及杭州地下道路之发展
..... 华爱姘(12)
 - 苏州太湖园博会外围交通管控与交通组织方案
..... 刘文婷, 徐乃云, 许永兵(15)
 - 德国城市道路Ortsdurchfahrt设计理念及其对中国的
借鉴意义 虞笑晨, 王崇伟(18)
 - 基于低碳交通的控制性详细规划编制新思路 ...
..... 郝晓丽, 杨申琳(23)
 - 北京新型商务园区道路设计探讨
..... 胡永立, 马树田(26)
 - 上海浦东机场下穿地道消防疏散方案构思
..... 黄欣杰(31)
 - 蓟汕高速公路天津段软土路基处理技术研究 ...
..... 苏勇, 周宁, 王莉, 刘存豪(33)
 - 水位变化对半填半挖陡坡路基渗流、稳定性及
沉降的影响分析 龙兵(38)
 - 塑料排水板超载预压处理下高速公路软基沉降的
数值模拟 曾欢(43)
 - 关于公路沥青混凝土路面设计现状的相关思考
..... 纪家诗(46)
 - 我国SMA路面应用现状调查与分析
..... 王晓杰(49)
 - 阿勒泰路罩面工程处理措施 王亮(52)
- ## 桥梁结构
- 奥地利城市桥梁建设撷英 穆祥纯(53)
 - 900 m跨组合钢箱梁斜拉桥方案试设计
..... 汤虎(58)

期刊基本参数: CN 31-1602/U * 1984 * m * A4 * 184 * zh * P * ¥25.00 * 10000 * 52 * 2016-03

- 高填方区桥梁设计方案探讨 方 蕾(62)
- 一座密布横梁钢桁梁桥的设计与分析
..... 金叔阳(65)
- 积石峡黄河大桥静载试验研究 胡 健,轩俊杰(68)
- 连续箱梁桥腹板斜裂缝的技术研究
..... 张西丁,潘志强(72)
- 关于景观桥梁方案设计思路的研究 唐 云(76)

防洪排水

- 南方某特大城市主城区排水防涝能力评估研究
..... 董 磊(79)
- 节水灌溉控制系统的应用研究
..... 池丽敏,张 倩,陈 丹(82)
- 天府新区成都片区直管区河湖水系规划体会
..... 游 屹,陆 柯,曾小云(85)
- 武汉市“智慧湖泊”综合效益分析 王 玉琴(88)

管理施工

- 大吨位钢箱梁履带吊吊装施工 王 陈(89)
- 顶推施工中波形钢腹板PC组合梁临时预应力钢束的
合理设置 成子桥,吕贵宾,赵振东(93)
- 顶推施工中波形钢腹板PC组合梁整体受力性能分析
..... 吕贵宾,杨 林,宋 雪(99)
- 挂篮法悬臂现浇连续梁桥的监测与监控
..... 滕峰斌(103)
- 轨道交通某拱桥吊杆锚头取出试验研究
..... 朱 妍,徐 磊,陈惟珍(108)
- 一次性合龙的长联多跨连续刚构桥梁支座预偏量计算
分析 杨秀荣,李 猛,姚丝思(112)
- 基坑周边超载作用位置对基坑支护结构变形的模拟
分析 胡 琳(114)
- 基于狭窄空间内基坑支护方案优化的应用
..... 黄华辉(117)
- 芳纶布在隧道管片结构裂缝加固中的施工应用
..... 陈飞飞(122)
- 静压法沉桩对周边环境的影响及其控制措施
..... 盛 晔(124)
- 富水砂砾石复合地层土压平衡盾构气压开仓施工技术
..... 董泽龙(127)

编委成员单位(排列不分前后)

主任编委单位:

上海市政工程设计研究总院(集团)有限公司

副主任编委单位:

北京市市政工程设计研究总院有限公司

天津市市政工程设计研究院

武汉市防汛指挥部

编委单位:

南京市水利规划设计院有限责任公司

中国市政工程西南设计研究总院

同济大学

上海市市政规划设计研究院

广东省建筑设计研究院

广州市市政工程设计研究院

沈阳市市政工程设计研究院

中国市政工程西北设计研究院有限公司

中国市政工程华北设计研究总院有限公司

上海市城市建设设计研究总院

武汉市市政工程设计研究院有限责任公司

武汉市城市防洪勘测设计院

武汉市水务科学研究院

西安市政设计研究院有限公司

重庆市设计院

重庆市勘测院

林同棧国际工程咨询(中国)有限公司

济南市市政工程设计研究院(集团)有限责任公司

成都市市政工程设计研究院

重庆市市政设计研究院

上海城建(集团)公司

上海公路桥梁(集团)有限公司

上海城建市政工程(集团)有限公司

杭州市市政工程集团有限公司

深圳市市政设计研究院有限公司

天津城建集团有限公司

浙江省大成建设(集团)有限公司

杭州市城建设计研究院有限公司

兰州市城市建设设计院

上海浦东路桥建设股份有限公司

上海市政交通设计研究院有限公司

上海弘路建设发展有限公司

保定市城乡规划设计研究院

上海奉贤建设发展集团市政公路工程有限公司

浅析市政道路施工质量控制措施 潘 斌(131)

上海地铁结构监护测量信息化管理的问题及对策

探讨 李家平(133)

勘察设计企业专利发展新常态探究 尤 熾(137)

科技研究

某滑坡治理方案的三维数值模拟分析

..... 宋民崇,余云燕,郭 阳,袁国柱(139)

沥青混合料路用性能与分维数的关系分析

..... 成 功,王 蕾(144)

黄土高填方路基工后沉降对比分析

..... 马 渊,庆 磊(147)

兰州杨家湾吊桥静载试验中的挠度检测研究

..... 索俊锋(150)

多塔斜拉桥承受电缆融冰雪温度荷载的数值模拟

方法 张春雷(154)

斜拉拱桥面内弹性稳定性研究 ... 汪 剑,陆 伟(158)

站桥合一高架车站振动舒适度分析 李文斌(162)

大跨度连续刚构桥地震碰撞效应研究

..... 张茂会,郑必灿,陈丽军(165)

高模量再生沥青混合料性能研究

..... 陈健侠,祝谭雍,李 伟,黄晓明(169)

钻孔灌注桩后注浆技术试验研究

..... 杜长虹,赵 栩,时志军(174)

基于小波包能量谱的古木结构损伤识别

..... 杨 帆,王 鑫(177)

成果应用

FRP复合材料在桥梁工程中的应用与发展

..... 汤洪雁,王秀艳(182)

广告索引

封一 成都市市政工程设计研究院

封二 上海申华声华学装备有限公司

封三 南塑建材塑胶制品有限公司

封四 上海汇城建筑装饰有限公司

广前1 青岛润邦防水建材有限公司

广前2 柳州欧维姆机械股份有限公司

广后1 上海强路路基材料有限公司

封面工程

本期封面工程为成都市二环快速路工程。成都市市政工程设计研究院为主体设计单位。

成都市二环快速路为双向6车道连续高架桥,桥梁单幅宽1275m,全长28.3km。其上布有快速公交系统,共设28对路中侧式快速公交站台(内外环站台分离)。快速公交系统与配套服务枢纽(金沙车站枢纽)采用专用高架桥相接。

二环路沿线原有道路断面变化多样,既有立交工程众多,交叉口密布,交通拥堵。工程建设本着充分利用既有道路空间资源的原则,通过对既有跨线桥顶升、既有互通叠建等多种方式,在城市核心区,打造出一条机动车中远距离、大范围移动的快捷通道。高架系统以及提档升级后的底层道路让二环路变成一条开敞大气的城市景观带。

成都市二环快速路工程于2012年竣工。工程建设牢牢把握“双快结合,同步建设,同步使用”的原则,二环快速路的通车之日即是快速公交系统运营之时。快速公交的便捷、准点以及与常规公交换乘的便利,让成都市民感受到:原来公交系统也有如此的高品质!

该工程2015年获住房和城乡建设部行业设计一等奖。

Urban Roads, Bridges & Flood Control

(Monthly)

Number 3, 2016(Total Number 203)

CONTENTS

ROADS & COMMUNICATION

Application of Park and Ride (P+R) System Theory in P+R System around Rail Transit Stations of Beijing Niu Ben, Qi Sai (1)

Abstract: With the continuous improvement of environmental awareness, the travel mode of park + ride (P+R) has been more and more adopted by the people, and used as a green travel mode. Aiming at the design of the P+R parking lots around the rail transit stations of Beijing, the article studies the theory of P+R parking system, sets forth the basic concept, basic type and composition of P+R system, and emphasizes the significance in the construction of P+R system. According to the investigation of the existing P+R parking lots in Beijing, the article describes the general problems existing in the present stage, and based on the characteristics of P+R system, optimizes and sums up a more complete set of design principles of this kind of parking lot, i.e. selection of site, layout of parking area, design of P+R system, selection of auxiliary facilities and etc. The article finally analyzes the relative design cases, evaluates this design principle, and puts forward a method of theory applying to practice.

Keywords: park and ride system (P+R), rail transit, design, theory application

Study on Design Scheme of Bus Lane Based on Complex Urban Development Background Ma Shengjun (5)

Abstract: With the change of local urban development, the planning construction of bus lane is more complex. Based on Xining City Wusi Corridor Bus Lane Project, the article introduces the design experience of bus lane under the complex urban development background of the connecting channel of old and new city areas, the design connection of old and new roads, the public corridor of rail corridor and bus lane, and the cooperation of intelligent transportation system and bus corridor, and sets forth the countermeasures for the different conditions.

Keywords: bus lane, old and new city areas, rail corridor, intelligent transportation

Master Design of Sink-style Road Structure of Shenzhen Side Connection Project in Shenzhen - Hongkong Western Corridor Ding Xingguo (9)

Abstract: The Shenzhen Side Connection Project of Shenzhen-Hongkong Western Corridor is a special passageway for cross-border vehicles of Shenzhen and Hongkong. It is a two-way six-lane expressway with the design speed of 80 km/h. The total length of main corridor is about 4.48 km in which the sink-style road is about 3.08 kilometers. The shallow box tunnel structure of sink-style road is composed of the fully concealed box structure, the semi-opening box structure and the fully opening structure. The article introduces the master layout of urban sink-style road, the division of foundation pit area, the effective application of enclosure structure and the master design of tunnel structure so as to achieve the design idea of energy conservation, environment protection and novel layout.

Keywords: sink-style road, shallow box tunnel structure, structure design

Elementary Analysis on Characteristics of Urban Underground Road and Development of Underground Road in Hangzhou Hua Aiya (12)

Abstract: The article briefly describes the characteristics of urban underground road and the development tendency of urban underground road, sets forth the successful construction cases of the different underground roads, analyzes the construction situation and shortcomings of underground roads in Hangzhou, and puts forward the issues for attention in the future construction of underground roads in Hangzhou.

Keywords: underground road, characteristic, development tendency, Hangzhou

Traffic Control and Traffic Organization Scheme outside of Taihu Garden Expo in Suzhou Liu Wenting, Xu Naiyun, XuYongbing (15)

Abstract: Suzhou Taihu Garden Expo is an important opportunity for city brand promotion, and also its produced high passenger flow causes greater challenges on the road traffic of city. Based on the transportation demand and the surrounding road network, the article puts forward the overall traffic organization scheme of Garden Expo, and analyzes and plans the travel flow line and the pedestrian traffic organization of the intensive transport means. At the same time, the time-interval traffic control scheme is proposed by the traffic volumes of road network in the forecasted peak, the general peak and the extreme peak in order to guarantee the road traffic smoothly during the exhibition period.

Keywords: traffic organization, traffic control, traffic operation

Design Idea of Urban Road - Local Express Cross-border Road in German - - - Yu Xiaochen, Wang Chongwei (18)

Abstract: It is to reduce its negative impact on the pattern, history, culture and economy of city to the greatest extent when the national highways and provincial highways run through cities and towns, and meanwhile the traffic functions are guaranteed so as to make the road engineering indexes conform to the needs of urban life. Therefore, the concept of this road - local express cross-border road appears in German. The article systematically describes the design idea of this road, introduces the "humanity road" idea into the design of this road, and fully considers the needs of various traffic participants and city planning from the ancillary facilities of road to design indexes of road so as to improve the safety and acceptability of highway in the town sections.

Keywords: German, urban road, local express cross-border road, design idea

New Idea for Compilation of Regulatory Planning Based on Low-carbon Traffic Hao Xiaoli, Yang Shenlin (23)

Abstract: The article analyzes the problems existing in the present compilation of regulatory planning of traffic system. In order to solve the discordance between the traffic system and land utilization in the regulatory planning, a new idea of regulatory planning compilation based on low-carbon traffic and the bus oriented is proposed. The new idea completes the district road network and land planning, introduces the "4-stage method" to establish the traffic model, and realizes the digitalization of traffic carrying capacity and land use coordinated development by the bus corridor and station as the basis. The new idea overcomes the bottleneck of the former traffic system in regulatory planning and the land use discordance, builds the road network with the characteristic of green traffic, realizes the low carbon of city development, relieves the traffic congestion and reduces the pollution of traffic system to city.

Keywords: regulatory planning, low-carbon traffic, transit oriented, traffic carrying capacity, New East Station

Discussion on Design of New Business Park in Beijing Hu Yongli, Ma Shutian (26)

Abstract: Taking Beijing Science and Technology Business District as an example, the article focuses introduction on the new idea and new concept of road design. The deep development and scientific technological innovation are in the design stage not only to break the routine and to do the design innovation, but also to propose the new idea and new concept. The new materials and the new technologies are used from the angle of environmental protection, scientific technology and energy conservation. The design technique of afforestation is used to strengthen the landscape and ecological design to build the park roads into the high-standard, high-quality and high-start garden landscape avenues. It is to work hard for building Beijing Science and Technology Business District into a new creative industry park integrated with functionality and ecological features, and for forming the symbiotic unity of “nature, building and human being”.

Keywords: new idea, design, ecology

Conception of Fire Control Evacuation Scheme for Underpass Tunnel of Shanghai Pudong Airport

..... Huang Xinjie (31)

Abstract: The article further studies the fire control evacuation scheme of underpass tunnel in Shanghai Pudong Airport, and puts forward the scheme conception. The relative experience can be referred for the similar projects.

Keywords: airport underpass tunnel, scheme conception, fire control evacuation

Study on Soft Soil Roadbed Treatment Technology for Tianjin Section of Jishan Expressway

..... Su Yong, Zhou Ning, Wang Li, Liu Cunhao (33)

Abstract: Aiming at the characteristics of the soft soil roadbed in Tianjin Section of Jishan expressway, the article proposes the soft soil roadbed treatment technological scheme for the different construction points, and studies the application of cast-in-situ foam light soil roadbed by the calculation and analysis of soft soil roadbed stability and settlement. The relative experience can be referred for the similar projects.

Keywords: soft soil roadbed, high-pressure jet grouting pile, cast-in-situ foam light soil, expressway

Analysis on Influence of Variation of Water Level on Seepage Flow, Stability and Settlement of Half-filled Half-excavated Steep Slope Roadbed

..... Long Bing (38)

Abstract: Taking a road in an urban park as an example, the article analyzes the seepage flow, stability and settlement of half-filled half-excavated Steep slope roadbed, and discusses the influence of underground water variation on the internal underground water seepage of this roadbed, the stability of side slope and the settlement deformation of roadbed, which can be referred for the design of the similar roadbeds.

Keywords: variation of water level, underground water seepage flow, roadbed stability, settlement deformation

Numerical Simulation of Expressway Soft Foundation Settlement under Overload Prepressing Treatment of Plastic Drainage Plate

..... Zeng Huan (43)

Abstract: According to the investigation and survey of engineering geological conditions in the overload prepressed treated road section of plastic drainage plate in the highways into a nuclear power plant, the parameters of soil body are achieved. The equivalent straight wall method is used to establish the finite element model to analyze the effective stress of embankment, and the variations of excess static pore water pressure and settlement in the settlement process of soft foundation. The result shows that the excess static pore water pressure within the soil body increases in the process from the start of filling to the design filling height. The increment of excess static pore water pressure will lead to the effect stress decrement of roadbed

soil body so as to reduce the shearing strength of soil body and to influence the roadbed stability. Therefore, it should be to strengthen the settlement and monitor the lateral horizontal displacement in the process of roadbed filling for the guarantee of roadbed stability. The monitoring result of filed settlement verifies the rationality of finite element software, and affirms the rationality of equivalent straight method used for solving the simulation of soft foundation settlement under the overload prepressing treatment of plastic drainage plate in highway.

Keywords: soft soil foundation, overload prepressing treatment of plastic drainage plate, finite element, settlement deformation

Deeply Thinking about Design Situation of Asphalt Concrete Pavement of Highway Ji Jiashi (46)

Abstract: At present, the design of highway asphalt concrete pavement has gradually become mature, but there are many factors to influence its design. These problems are the important factors to restrict the highway development and technology advance. The article analyzes the design situation of highway asphalt concrete pavement. The relative experience can be referred for the similar projects.

Keywords: highway, asphalt concrete, pavement design, situation

Investigation and Analysis on Application Situation of SMA Pavement in China Wang Xiaojie (49)

Abstract: The SMA pavement has been introduced and applied over 20 years in China, and has been widely used in high-grade highways and municipal roads because of its excellent performance and engineering practice in China. However, compared with the SMA pavements having been widely used in Europe and the United States, the application of SMA pavement in China presents two major characteristics that the application scale and scope are large in the eastern coastal areas, and small in the mid and west areas where the application of SMA pavement started late, and more application in high-grade highways and less application in municipal roads. The further analysis shows that the cost and technologies are the root cause to block the popularization in large scale and scope of SMA pavement in China.

Keywords: SMA pavement, application, investigation, analysis, scope, scale

Treatment Measures for Altay Road Overlay Project Wang Liang (52)

Abstract: At present, the cement concrete pavements have the different faults in many cities because of sharply increased traffic volume, too heavy vehicle axle load and pavement in bad repair. The article introduces the faults existing in Altay Road of Urumchi City. The relative experience can be referred for the similar projects.

Keywords: cement concrete pavement, faults, asphalt overlay, treatment measures

BRIDGES & STRUCTURES

Construction of Urban Bridge in Austria Mu Xiangchun (53)

Abstract: The article systematically introduces the general impression, the classified investigation, the relative inspiration and proposal of bridge construction in Vienna, Salzburg and Innsbruck of Austria so as to promote the health development of urban bridge in China, which can be referred for the construction of the similar bridges.

Keywords: investigation, Austria, urban bridge, bridge construction, relative inspiration

Test Design of 900-m Span Composite Steel Box Beam Cable-stayed Bridge Scheme Tang Hu (58)

Abstract: For the background of a crossing-strait project, and aiming at the 900-m long span, the article

describes the test design of composite steel box beam cable-stayed bridge. According to the structural stress analysis of finished bridge state, the article discusses the dynamic and static performances of this bridge, and also proves the feasibility of this scheme. Compared with the cable-stayed bridge of steel main beam, this kind of the bridge can improve the local rigidity of bridge deck system and solve the problems of fatigue and easy pavement damage of orthogonal steel bridge deck. The development of applicable span of composite steel box beam cable-stayed bridge is one of selections adapting the construction demand of crossing-sea bridge projects in the future.

Keywords: cable-stayed bridge, composite steel box beam, bridge design, scheme

Further Discussion on Design Scheme of High Filled Bridge Fang Lei (62)

Abstract: It is very important to select the reasonable design scheme of high filled bridge during the design. Taking an urban bridge as the study background, the article analyzes the design gist of high filled bridge design scheme, puts forward the principle of scheme selection, and also proposes the engineering construction of high filled road section, which can be referenced for the design of the similar projects.

Keywords: high filling, bridge, design scheme, subgrade settlement

Design and Analysis of a Steel Truss Bridge with Dense Transverse Beams Jin Shuyang (65)

Abstract: Wenjiang Bridge in Taixing City is a 40-m steel truss bridge located at the complex boundary condition with many limited factors. Combined with whole design process of Wenjiang Bridge, this paper mainly introduces the general design idea, analyzes the key technological difficulties of this bridge, and summarizes the advantages of this bridge style used for T-intersection reconstruction project (crossing the river), which can be referred for the similar projects.

Keywords: steel truss bridge, dense transverse beam, design of restricted beam height, T-intersection reconstruction

Static Load Test Study of Jishixia Bridge Hu Jian, Xuan Junjie (68)

Abstract: Based on the static load test of Jishixia Bridge, the article introduces the actual working state and carrying capacity of bridge structure under the static load action. By the comparison and analysis of theoretical stress value and measured value of bridge control sections, the article makes the simulation analysis by ANSYS software in order to judge the safe carrying capacity of bridge structure and to make a preliminary assessment of the bridge operation quality.

Keywords: bridge inspection, static load test, load case, finite element analysis

Technical Study on Web Inclined Crack of Continuous Box Beam Bridge Zhang Xiding, Pan Zhiqiang (72)

Abstract: The web inclined crack of continuous box beam bridge is the prominent problem of box beam bridge in recent years. The article analyzes the influence factor and control measures for the web inclined crack of box beam from two aspects of design and construction, puts forward and separately analyzes the main factors of calculation mode, web thickness, pre-stressed bar layout type, temperature, concrete shrinkage creep and improper construction to influence the web inclined crack of box beam, and gives the control measures for the web inclined crack of box beam.

Keywords: web inclined crack, web thickness, pre-stressed bar, temperature stress, concrete creep

Study on Design Idea of Landscape Bridge Scheme Tang Yun (76)

Abstract: With the continuous development of the levels of material civilization and spiritual civilization of human society in recent years, the higher requirement is also proposed for the bridge design, not only to pursue the perfection of bridge appearance, but also to have the definite artistic value and practical value.

Therefore, more importance should be attached to the bridge design to make it more beautiful on the basis of original bridge structure. The article analyzes and discusses the design of landscape bridge scheme. The relative experience can be referred for the similar bridges.

Keywords: landscape, bridge, design

FLOOD CONTROL & DRAINAGE

Evaluation and Study on Capabilities of Drainage and Waterlogging Prevention in Main Town of a Large Southern City Dong Lei (79)

Abstract: On the basis of investigate and survey the topography, weather, hydrology, and present waterlogging drainage facilities in a main town of a large southern city, the Infoworks ICM hydraulic model is used to carry out one-dimensional (1D) simulation of drainage pipeline network and to evaluate the drainage capabilities of present rainwater pipe channel under the different return periods of rainfall. At the same time, based on GIS technology, the digital elevation model (DEM) of the main town is built. The 1D drainage pipe network model coupled with two-dimensional (2D) land overflow model is used to analyze and determine the risk distribution diagram formed in the waterlogging range under the design rainfall condition of 24 hours once in 50 a, and to analyze the waterlogging cause. The planning scheme is proposed to guide the construction and management of drainage and waterlogging preventive facilities in order to ensure the maximum mitigation of disasters during the typhoon and flood periods.

Keywords: drainage and waterlogging prevention, model, rainfall, waterlogging return period

Research on Application of Water Saving Irrigation Control System Chi Limin, Zhang Qian, Chen Dan (82)

Abstract: Water-saving irrigation control is to study how to carry out the reasonable irrigation according to the soil conditions, soil moisture information and crop water demand characteristics. The reasonable irrigation decision is automatically to control the irrigation timely and accurately as required, which changes the traditional method depending on the experience to control irrigation by the manually operated valve control. The whole control system is composed of four modules: inspection module, data processing module, digital module and control module. According to the set value to control irrigation, the whole control system can be worked normally, which realizes the goal of timely and accurately to control irrigation as required, and highly effective saving water.

Keywords: irrigation of saving water, irrigation control, automatic control

Planning of River and Lake System in Chendu District of Tianfu New Area You Yi, Lu Ke, Zeng Xiaoyun (85)

Abstract: Combined with the planning of the river and lake system in Chendu District of Tianfu New Area, the article analyzes the planning contents of space layout, function, water flow and water quality control of river and lake system, and sums up the significance and value of water system planning.

Keywords: water system planning, sponge city, interaction, significance and value

Analysis on Comprehensive Benefit of “Intelligent Lakes” in Wuhan Wang Yuqin (88)

Abstract: The article introduces the present management of lakes in Wuhan and the contents of “intelligent lakes” in Wuhan. The “intelligent lakes” are to newly build the video monitoring platform, switch in multi front-end video monitoring devices, and build the lake geographic information platform and lake morphological analysis platform. The article discusses the social benefit, environmental benefit and economic benefit of this project.

Keywords: intelligent lakes, social benefit, environmental benefit, economic benefit

MANAGEMENT & CONSTRUCTION

Hoisting Construction of Large-tonnage Steel Box Beam by Crawler Crane Wang Chen (89)

Abstract: The article introduces the steel box beam hoisting construction of elevated bridge overpassing the main line in a viaduct of Nantong. The most weight of hoisted segment is 211.5 t, which has to be hoisted by CC2500-1 500-t crawler crane plus super-lifting device. The temporary support is the steel latticed support composed of $\phi 400 \times 8$ steel pipe and 16# channel steel. The box beam after welded and inspected up to standard is carried out of system transformation. The steel box beam is smoothly and steadily fallen on permanent support. The temporary support is dismantled.

Keywords: steel box beam, hoisting, temporary support, viaduct

Reasonable Layout of Temporary Pre-stressed Steel Beam for Corrugated Steel Web PC Composite Beam in Incremental Launching Construction Cheng Ziqiao, Lv Guibin, Zhao Zhendong (93)

Abstract: In order to analyze the influence of the temporary pre-stressed steel beam for corrugated steel web PC composite beam on the structure stress in the process of bridge incremental launching construction, to ensure the concrete structure not destroyed in the incremental launching construction of bridge, and according to the long-span corrugated steel web PC composite beam in the integrated incremental launching construction firstly in China, the shell solid model is used to simulate the structure of corrugated web composite box beam, and its internal and external prestressing in detail, calculate and analyzes the effects of reasonable position, prestressing size and steel beam amount of temporary pre-stressed steel beam on the stress of composite beam under the most unfavorable condition of incremental launching construction, and put forward the reasonable layout method of temporary pre-stressed steel beam to ensure the safety of beam structure, which can be referred for the design and construction of the similar structures.

Keywords: incremental launching construction, corrugated steel web, composite beam, temporary prestressing

Analysis on Integrated Stress Performance of Corrugated Steel Web PC Composite Beam in Incremental Launching Construction Lv Guibin, Yang Lin, Song Xue (99)

Abstract: There is the greater difference between the stresses of corrugated steel web PC composite beam in the finished bridge state and in the incremental launching construction. In order to make clearly the stress performance in the incremental launching construction of box beam, according to the long-span corrugated steel web PC composite beam in the integrated incremental launching construction firstly in China, the shell solid model is used to calculate the stress performance of each component of composite box beam. The result shows the stress variation law of the concretes at the top and bed of box beam in the different positions, the reaction variation of buttress and the deformation of beam, which can be referred for analyzing and calculating the structural stress of the similar bridges.

Keywords: corrugated steel web, incremental launching, shell solid model, top-bed concrete, stress variation law

Inspection and Monitoring of Cantilever Cast-in-situ Continuous Beam Bridge by Form Traveller Teng Fengbin(103)

Abstract: It is very important to control isotropic geometric error for the safety and quality of completed bridge in every section of construction proves by form traveller. The article introduces the monitoring items, methods, modeling calculation, process monitoring and result of a bridge project crossing Xinhui River in Shanghai.

Keywords: cantilever cast-in-situ, bridge, modeling calculation, construction inspection and monitoring

- Study on Pulling-out Test of Sag Rod Head for an Arch Bridge in Rail Transit Zhu Yan, Xu Lei, Chen Weizhen (108)
- Abstract:** Taking the replacement of sag rod of an arch beam combined bridge as the engineering background, the article studies the complete set of technology of pulling out the sag rod by the test. Aiming at the sag rod poured by epoxy iron sand in duct, the comparison test of water jet method, drilling method and melting method shows that the use of water jet method is feasible to rush away the epoxy iron sand auxiliary with the drilling and acetylene cutting to remove the anchor head, and then able to pull out the sag rod.
- Keywords:** arch bridge, replacement of sag rod, water jet, epoxy iron sand
- Calculation and Analysis on Pre Deviator of Support for One-off Closed Long-coupled Multi-span Continuous Rigid-frame Bridge Yang Xiurong, Li Meng, Yao Sisi (112)
- Abstract:** For the long-coupled multi-span continuous rigid-frame bridge, its beam will be extended or shortened under the effects of temperature and concrete shrinkage creep so that the support will be eccentrically stressed. The finite element analysis software - Midas Civil is used to establish the model of Juhe River Bridge Project in order to analyze and calculate the support displacement caused by the construction scheme of this one-off closed bridge and the support displacement under 10 a shrinkage creep and temperature variation considered in the stage of bridge completion. Finally, the reasonable pre deviator of support is given.
- Keywords:** long-coupled multi-span, continuous rigid-frame bridge, one-off closure, pre deviation of support
- Simulation Analysis of Overload Position around Foundation Pit on Supporting Structure Deformation of Foundation Pit Hu Lin (114)
- Abstract:** Taking a deep foundation pit project of metro station as the background, the article introduces the use of FLAC3D finite difference software to establish the suitable model for excavating the foundation pit by layers and steps under three different conditions of long side, short side and far-near position from overload to pit. Based on the calculation results of FLAC3D software, the article compares and analyzes the deformations of underground diaphragm wall in the excavation of each layer under three different conditions, and sums up the effect law of three different conditions on the safety of supporting structure.
- Keywords:** overload position, FLAC3D simulation, deformation of underground diaphragm wall, safety of supporting structure
- Optimization and Application of Foundation Pit Supporting Scheme in Narrow Space Huang Huahui (117)
- Abstract:** According to the engineering practices of running water advanced treatment project, the article analyzes the characteristics and difficulties of advanced treatment engineering, and sets forth the optimization and application of engineering supporting scheme of foundation pit. The scheme optimization and its construction process control can reliably achieve the safe, high-effective and economic effects, which can provide some reference value for the implementation of the similar engineering projects.
- Keywords:** narrow space, foundation pit, supporting scheme, optimization
- Application of Aramid Fiber Cloth in Crack Reinforcement of Tunnel Segment Structure Chen Feifei (122)
- Abstract:** The cracks of tunnel structure increasingly appear. The pasting of the aramid fiber cloth is the common method to treat and reinforce the tunnel deformation. The article introduces the pasting width, construction technology and construction step of aramid fiber cloth. Taking the Nanjing Metro Line 2 Project as a case, the article introduces the inspection of its reinforcement effect. The result shows that the working state of this cloth is good and has the important engineering practical value.

Keywords: tunnel structure, aramid fiber cloth, crack reinforcement

Influence of Pile Sinking by Static Pressure Method on Surrounding Environment and Its Control Measures

Sheng Ye (124)

Abstract: There will be obvious soil squeezing effect during the pile sinking construction by static pressure method in saturated soft soil so as to cause the adverse impact on the environment around the pile sinking area. The article analyzes the influence of soil squeezing effect during pile sinking on the surrounding environment and its functional mechanism, and proposes the control measures to effectively reduce the influence of soil squeezing effect of pile sinking on the surrounding environment by the practical engineering cases.

Keywords: pile sinking by static pressure method, soil squeezing effect, environment influence, control measures

Earth Pressure Balance Shield Excavation Chamber Tunneling Technology in Water-rich Sand Gravel Complex Stratum

Dong Zelong (127)

Abstract: The machine cutter is seriously worn when the shield tunneling is in the sandy gravel stratum. Therefore, it is necessary to select the suitable opportunity for excavating chamber to inspect and replace the cutters. In the shield tunneling, there are three methods to excavate chamber for inspection. The first is to pressurize for excavating chamber to inspect, the second is to reinforce the front soil body, and then excavate to inspect under the normal pressure, the third is to construct shaft from the ground downward to the front of cutter disc so as to realize the inspection and maintenance of shield cutters. According to the introduction of the shield excavation chamber tunneling in the Civil Construction Bid II of Nanchang Metro Line 1 Phase I Project, the article discusses the shield excavation chamber tunneling technology in water-rich sand gravel stratum.

Keywords: shield, complex stratum, pressure excavation chamber, water-rich sand gravel

Elementary Analysis on Control Measures for Construction Quality of Municipal Road

Pan Bin (131)

Abstract: The municipal road is not only related to city construction, but also to the construction of city infrastructure, and even more to the people's life and property safety. At the same time, its construction quality embodies the efforts of government to local construction and the concern extent of government to livelihood issues. But in the practical construction, some problems exists in the construction of municipal road in China, which result in various problems existing in the use of road, and the increment of the maintenance cost, invested manpower and material resource of road. Therefore, it is the key to control the construction quality, to reduce the maintenance cost and improve the construction quality of municipal road. The article briefly analyzes the characteristics, existing problems and quality control measures for the construction of municipal road.

Keywords: municipal road, construction quality, control measures

Discussion of Problems and Countermeasures in Structural Monitoring and Measurement Informatization management of Shanghai Metro

Li Jiaping (133)

Abstract: Taking Shanghai Metro as an example, the article analyzes the informatization management demand of metro structure monitoring. The building of data standardization, development of information platform, sharing of industries, popularization and application of advanced testing technology can effectively improve the informatization management ability of metro structural monitoring and measurement.

Keywords: metro, structural monitoring, management, informatization

Study on New Normality of Patent Development in Survey and Design Enterprises You Yan (137)

Abstract: The article introduces the development history of the patent systems at home and abroad, sets forth the significance and measures of completing the patent management work in survey and design enterprises under the situation of “public entrepreneurship, mass innovation”, and puts forward the traditional patent service concept to be changed in survey and design enterprises, which will do a good job in all directions and personal service for the innovation of enterprises.

Keywords: survey and design enterprise, patent management, patent law

STUDY ON SCIENCE & TECHNOLOGY

Three-dimensional Numerical Simulation of a Landslide Treatment Scheme

..... Song Minchong, Yu Yunyan, Guo Yang, Yuan Guozhu (139)

Abstract: Combined with the practical engineering background of a landslide, the FLAC3D software is used to establish a simplified three-dimensional model to analyze the landslide stability, and quantitatively to analyze the overall displacement contour of the landslide and its displacement contour in the main slip direction (Y direction and Z direction). The location of the sliding surface is identified in shear strain increment contour so as to offer a reasonable layout location of the anti-sliding and protecting structures. The prestressed anchor cable frame and the prestressed anchor cable anti-slide pile are simulated to reinforce and treat the landslide. The treatment effect is analyzed and evaluated.

Keywords: landslide, stability analysis, FLAC3D, numerical simulation

Analysis on Relationship between Pavement Performance of Asphalt Mixture and Fractal Dimension

..... Cheng Gong, Wang Lei (144)

Abstract: Fractal theory has been used in gradation design of pavement in recent years. By means of analyzing the relationship between fractal dimension and pavement performance index in the different gradations, the conclusion shows that when the fractal dimension $D1=2.30$, dynamic stability of single-layer rutting is relatively high; when $D1=2.20$, dynamic stability of composite rutting is relatively high and the decline ratio of dynamic stability is relatively small; when $D1>2.40$, ultimate bending strain is larger. In addition, there is no obvious relationship between freeze-thaw splitting test strength ratio (TSR) and fractal dimension.

Keywords: road engineering, asphalt mixture, pavement performance, fractal dimension

Comparison and Analysis on Post-construction Settlement of Loess High-filled Roadbed

..... Ma Yuan, Qing Lei (147)

Abstract: Aiming at the problem of post-construction settlement often existing in the loess high-filled roadbed of the northwest region in China, the modified Cam-clay model is used to carry out the simulation analysis in the practical projects so as to obtain the numerical result of settlement and to summarize the settlement law. The analysis results agree better with the empirical formula. The settlement law is identical with the in-situ test of the similar projects. An analysis way is provided for the design and construction of post-construction settlement of high-filled roadbed in loess regions.

Keywords: settlement analysis, modified Cam-clay model, loess, special roadbed, high slope

Study on Deflection Detection in Static Load Test of Yangjiawan Suspension Bridge in Lanzhou

..... Suo Junfeng (150)

Abstract: The static load test of bridge is an important method to evaluate the quality of the bridge and to verify whether or not the bearing capacity of the bridge meets the design requirement. And the deflection

measurement is an important part of bridge detection. Based on the practical case of static load test detection of Yangjiawan Suspension Bridge in Lanzhou, this paper sets forth the layout and measurement method of displacement observation point, and test load design principles in the static load test. By the analysis of experimental data, deflection curve and displacement change, the results show that the bridge deformation is normal in the test load and the bearing capacity can meet the service requirements of the design load after maintenance and reinforcement. And the bridge deck is smoother, and the upstream and downstream symmetries are better.

Keywords: static load test, deflection detection, displacement, Yangjiawan Suspension Bridge, linear measurement

Numerical Simulation Method of Multi-pylon Cable-stayed Bridges under Melting Ice-snow Temperature Load Induced by Electric Cables Zhang Chunlei (154)

Abstract: The technology of melting ice-snow through heating method has been used widely with engineering applications. Due to the particularity of the temperature field and the complexity of the multi-pylon cable-stayed bridges, a few researches have been reported on the influences of the temperature load on the mechanical properties of multi-pylon cable-stayed bridges. In this paper, the feasibility of simulating temperature field is analyzed with the method of applying node temperature on the solid element. The impacts of constraint modes and diaphragm on the temperature load are studied. Thus, the numerical simulation method of building mixed element and applying node temperature to simulate temperature field is proposed. Finally the mechanical properties of a multi-pylon cable-stayed bridge under melting ice-snow temperature load induced by electric cables are analyzed.

Keywords: multi-pylon cable-stayed bridge, melting ice-snow through electric cables, numerical simulation, mechanical properties

Study on Planar Elasticity Stability of Cable-stayed Arch Bridge Wang Jian, Lu Wei (158)

Abstract: The cable-stayed arch bridge is a new kind of arch structural bridge. The comparative analysis of the planar elasticity stability is made between cable-stayed arch bridge and normal arch bridge. Meanwhile, the planar elasticity stability of cable-stayed arch is calculates and analyzed under the different working conditions of rise span ratio, boundary condition and loading. The influence of tension parameters (tension location on arch and inclination of stayed cable) of stayed cable on the planar elasticity stability of cable-stayed arch bridge is discussed.

Keywords: cable-stayed bridge, stability, ANSYS

Analysis on Vibration Comfort Level of Elevated Station for Viaduct Li Wenbin (162)

Abstract: Aiming at the vibration comfort level of elevated station for viaduct, the finite element model of elevated station structure is established to input the running load of high-speed rail train and to calculate the dynamic response of structure vibration in the time domain. Based on the present common international standard, the comfort level of each floor is evaluated.

Keywords: elevated station, vibration comfort level, evaluation standard

Study of Seismic Impact Effect on Long-span Continuous Rigid-frame Bridge

..... Zhang Maohui, Zheng Bican, Chen Lijun (165)

Abstract: Aiming at the impact phenomenon at expansion joints of bridge structure under the earthquake, and based on the rigid body impact analysis theory, the gap unit is used to simulate the impact action. The finite element model of long-span continuous rigid-frame bridge is established under the evaluation wave function. The analysis result shows that the plastic deformation of the bridge pier reduces the response of structural

internal force under the earthquake, but the structural displacement increases and the impact effect strengthens. The impact force of bridge is very large maximum to 10.9 times of the original structure, which is easy to result in the destruction of the concrete at the end of beam. The analysis method can be referred for the analysis of the similar projects.

Keywords: rigid-frame bridge, impact, nonlinear time-procedure analysis, gap unit, seismic response

Study on Performance of High Modulus Recycle Asphalt Mixture

..... Chen Jianxia, Zhu Tanyong, Li Wei, Huang Xiaoming (169)

Abstract: In order to study the pavement performance of hot recycle high modulus asphalt mixture, and according to the modified asphalt made up of the normal asphalt and the differently mixed Budun rock asphalt (BRA), the article analyzes the effect law of BRA mixing amount on the performance of modified asphalt, and determines the reasonable mixing amount of BRA by taking the dynamic modulus of modified asphalt mixture as the index. Through the tests of dynamic modulus, high temperature stability, low temperature stability, water stability and fatigue property of recycle mixture under the different mixing amounts of old mixture, the article puts forward the reasonable mixing amount of hot recycle high modulus asphalt mixture. The result shows that the high temperature stability of modified asphalt is improved to some extent with the increment of BRA amount, and the reasonable amount of BRA is 40%. The increment of old asphalt amount has a little influence on the modulus improvement of recycle mixture. The increment of old asphalt amount is beneficial to improve the rut resistance of recycle mixture, but will affect its low temperature stability. When the old asphalt amount is less than 60%, the influence is a little on the water stability of high modulus recycle mixture. Too high old asphalt amount will go against the fatigue property of high modulus recycle mixture.

Keywords: recycle asphalt mixture, high modulus, pavement performance

Experiment and Study on Post-grouting Technology of Cast-in-situ Pile

..... Du Changhong, Zhao Xu, Shi Zhijun (174)

Abstract: The bearing modals of the post-grouting cast-in-situ piles are possibility different under the different geological conditions. According to the test and study on the post-grouting cast-in-situ pile at the pile end taking the mudstone as supporting stratum, it is found that the cement slurry will radially permeate when the harder rock layer as the supporting stratum. The pile-end resistance is not obviously improved. The upper friction resistance of pile weakens, but the lower strengthens. The cement slurry reinforced solid bodies formed under the different geologies and the different construction conditions are different. Therefore, the article considers that the design and application of post-grouting cast-in-situ pile should be used of a new control method.

Keywords: cast-in-situ pile, post-grouting, experiment, study

Damage Identification of Ancient Wood Structure Based on Wavelet Packet Energy Spectrum

..... Yang Fan, Wang Xin (177)

Abstract: According to the finite element analysis of ancient wood structure damage, the article proposes the wavelet packet energy gradient index of ancient wood structure under random incentive function. The result shows that this index is more sensitive to the damage of ancient wood structure and can accurately determine its structural damage location. The greater is damage degree, the greater is index. The method is proposed to determine the damage degree of ancient wood structure, and to verify its applicability, which provides the theory basis for the study the damage identification of ancient wood structures under environment excitation.

Keywords: ancient wood structure, finite element, wavelet packet energy spectrum, damage identification, wavelet packet energy gradient

APPLICATION OF ACHIEVEMENTS

Application and Development of Fiber Reinforced Plastic (FRP) Composite Material in Bridge Engineering

..... Tang Hongyan, Wang Xiuyan (182)

Abstract: FRP material has the advantages of light weight, high strength and corrosion resistance, and has the great significance to solve the problems existing in the bridge engineering now. The article summarizes the application situation of FRP material in bridge, and prospects the future of its application.

Keywords: FRP, composite material, corrosion, degradation

.....

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

Urban Roads, Bridges & Flood Control

Monthly

Number 3, 2016 (Total Number 203)

Publication on March 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

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**

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。

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。



封层处理后



路面渗水性



路面耐磨系数（摆式BPN）测试



暴露轮碾试验

地址：上海市嘉定区曹联支路8号 邮编：201804

电话：021-35120467 65432873 65439619 传真：021-65199183