

工程技术研究

Engineering and Technological Research



主管单位 广东省冶金工业总公司
主办单位 广州市金属学会
广东工程职业技术学院

2022
总第 123 期



工程技术研究

ENGINEERING AND TECHNOLOGICAL RESEARCH

2016 年创刊（半月刊）

第 19 期 总第 123 期

第 7 卷 2022 年 10 月 10 日

国内外公开发行

主管单位 广东省冶金工业总公司

主办单位 广州市金属学会

广东工程职业技术学院

《工程技术研究》编委会

期刊顾问 毛新平

主任 李烈军

副主任 李绍康 张海

委员 邓孙成 刘宇红 李智彪 邱显扬

(按姓氏笔画排序)

张增兴 陈昌 陈小祝 陈学文

林广明 郑开宏 顾林娜 黄志勇

黄楚华

主编 刘安华

副主编 陈学文

执行副主编 谢友义

编辑 张晶 雷丹 宁雪 张彦然

电话 020-28163491

编辑发行 《工程技术研究》编辑部

地址 广州市天河区凤凰街渔兴路 18 号

投稿邮箱 gczztg@163.com gczztg@126.com

邮政编码 510520

定价 人民币 15 元

印刷单位 广州市永祥印务有限公司

连续出版物号 ISSN 2096-2789

CN 44-1727/N

广告经营许可证 440100100002

目次

工程前沿

基于电磁波法的砂土地基堤坝含水率诊断研究*

喻江, 陆俊, 董茂千, 等 1

夏季高温天气下 CRTS I 型板式无砟轨道水泥乳化沥青砂浆
施工技术研究

王文涛 4

基于 Webster 原理的中小城镇道路交叉口组织优化及信号控制

王爽, 陈伟伟*, 刘孟龙, 等 7

隧道初期支护与微型桩组合结构 CRD 工法内力计算探讨

杨晔 10

TOD 模式下轨道交通车站建筑与城市的互动探讨

马千程 13

刚架拱桥增大截面加固设计及承载能力评定

——以广东省秋云大桥为例

何炳涛 16

旧水泥混凝土路面共振碎石化施工技术研究

杨峻峰 19

钢筋密集大构件复杂节点混凝土内部缺陷检测技术应用

杨双喜 22

旧水泥混凝土路面沥青加铺层反射裂缝破坏机理与防治措施
分析

肖丽霞 25

著作权使用声明

本刊已许可中国知网以数字化方式复制、汇编、发行、传播本刊全文。本刊支付的稿酬已包含中国知网著作权使用费, 所有署名作者向本刊提交文章发表之行为视为同意上述声明。如有异议, 请在投稿时说明, 本刊将按作者说明处理。

路面病害数字化检测技术在京台高速公路改扩建工程中的应用 赵 旭 28

湖南传统村落革命遗址数字化保护与利用研究*
邓翔宇, 孙 明*, 易礼珍 31

工程技术与应用

硬岩孤石地质条件下液压潜孔锤旋挖钻机组施工技术研究
——以汕头大学学生宿舍二期建设项目为例 王雄旭 34

磁梯度技术在深埋管线探测中的应用研究
张利波, 任攀虹 37

城市地铁工程隧道扩挖施工技术研究 胡秋芳 40

水利大坝工程防渗面板施工技术研究
——以沿塘水库工程为例 韦 全 43

高应变法在基桩承载力检测中的应用分析 王家满 46

大跨度现浇悬臂梁挂篮施工技术分析 陶云德 49

市政工程雨污水管网施工技术要点分析 秦 汉 52

房屋建筑工程地基施工技术要点及应用措施分析
林涌标 55

装配式建筑预制叠合板施工工序及关键技术研究
廖金湘 58

郑州某地铁车站主体结构模板支架专项施工及安全管
理分析 李 龙 61

无人机倾斜摄影测量技术在土地勘测定界工作中的应
用 何子建 64

工程设备与材料

隧道地质雷达超前地质预报技术应用研究
——以斋堂隧道工程为例 黄奕钦 67

C30 ~ C50 自密实混凝土的配制技术研究
李凤伟, 孙 义 70

管廊工程中步履式模板台车和传统木模板施工工艺
对比

——以鄂州市将军片区配套基础设施工程为例
刘方明, 崔成华 75

组合铝合金模板体系在剪力墙结构住宅施工中的应用
刘 颖 78

旋挖钻机施工技术在高原高海拔砂卵石地层中的应用
孙志远 81

墩梁连接时机对铁路钢盖梁高门式墩受力性能的影响
刘 兵 84

高寒山区 DTC 相变自调温沥青路面施工技术研究
——以甘肃 S232 项目工程为例

王 昆, 付 庭, 周龙强, 等 87

剪力墙钢筋网片加固施工方法应用研究
——以东莞东部工业园内“天集·磁海一期”项目为例

王玉龙 90

汉中某水厂给水管道路施工中不锈钢内衬修复法的应用
王存汉 93

水利工程排水管井中可拆换式过滤器的应用 邓 磊 96

建筑工程钢筋损耗控制技术研究
杜 璇, 王剑伟, 白立辉 99

风力发电塔架防腐涂装工装设计研究
夏宇龙, 李 雯, 唐 斌 102

工程管理

码头工程合同变更和索赔管理研究
——以唐山港京唐港区 36 号~40 号煤炭泊位码头振
冲碎石桩工程为例 吴振兴 105

云南省不同计价标准下的污水管网工程造价对比分析
尚正蓉, 李佳钰, 杜佳姚 108

桥梁工程施工中大体积混凝土裂缝成因及处理措施研究	袁伟财	111
市政给排水管网优化配置分析	赫亚宁, 牟凤燕	114
基于 BIM 技术的建筑工程施工成本控制研究	李焯宇	117
地铁盾构管片接缝的防水施工分析	沈子贺, 郭义, 王浩楠, 等	120
房建工程施工管理中现存的问题及对策研究	王磊	123
市政给排水施工存在的问题及质量控制分析	康文庆, 郭晓光	126
海绵城市理念在城市污水处理厂建设工程中的应用	王智	129
提高沥青路面平整度的施工控制措施研究	叶碧芬	132
公路排水设施病害处治措施研究	袁宏成	135

工程教育

新时代高职院校感恩教育的实践路径	尹国胜, 刘潇	138
基于利益关系者视角的图书馆数字人文建设指标重要性研究	罗文菁	141
基于降水量调配蓄电池的水利工程监测预警系统研究	卢鑫祥, 李晓鹏	148

工程设计

考虑膨胀土影响的土钉支护设计方案对比分析 ——以平顶山市某膨胀土基坑项目工程为例	严神通	151
双层立体复合式高速公路互通立交改扩建方案设计 ——以常虎、莞深高速公路改扩建工程为例	梅本胜, 杨丽珍	154

昂多光伏电站场区大比例尺地形图快速生产方案设计	杨丽颖	157
珠江沿岸桥梁装饰工程设计	高敏英, 梁媚	160
基于排水防涝安全的市政工程建设对策分析	杨娟, 张慧, 秦玥	163
生态型护岸在水利工程设计中的应用	荣萌萌	166
市政排水防涝设计水平提升策略分析	秦玥, 杨娟, 张慧	169
基于某水系连通工程的智慧水利系统研究	李骥	172
大直径盾构隧道扩挖车站建筑设计方案研究	韩皓, 张治港, 董佳鹏, 等	175
山区高速公路选线优化研究	白云鹏	178
某有顶商业步行街建筑消防设计优化措施探讨	黄强, 陈怡	181

发展与创新

广东省濠江制梁场降低勘察工作量的对策分析	孙宇奇	184
工业园区固废处置场项目水土流失影响因素及防治措施分析 ——以宁夏中宁县工业固废处置场项目为例	谢涛, 冯海林, 马翔	187
贵州省德江县高位隐蔽性地质灾害形成条件分析	朱刚	190
吴忠市某养殖场水土流失分析及防治措施	马翔, 谢涛, 冯海林	193
地下人防工程内部空气质量现状及改善措施分析	李静, 汪波, 韩晓霞, 等	196

ENGINEERING AND TECHNOLOGICAL RESEARCH

No. 123 October, 2022

Contents

Engineering Frontier

- Research on Moisture Content Diagnosis of Sand Foundation Dams Based on Electromagnetic Wave Method* Yu Jiang, Lu Jun, Dong Maogan, et al 1
- Research on Construction Technology of Cement Emulsified Asphalt Mortar for CRTS I Slab Ballastless Track under High Temperature Weather in Summer
Wang Wentao 4
- Organization Optimization and Signal Control at Road Intersections in Small and Medium-sized Towns Based on Webster Principle
Wang Shuang, Chen Weiwei*, Liu Menglong, et al 7
- Discussion on Internal Force Calculation of CRD Construction Method for Tunnel Initial Support and Micro-pile Composite Structure Yang Ye 10
- Discussion on the Interaction between Rail Transit Station Buildings and the City under TOD Mode Ma Qiancheng 13
- Enlarged Section Reinforcement Design and Bearing Capacity Evaluation of Rigid Frame Arch Bridges
—Taking Qiuyun Bridge in Guangdong Province as an Example He Bingtao 16
- Research on Resonance Crushing Construction Technology of Old Cement Concrete Pavement Yang Junfeng 19
- Application of Concrete Internal Defect Detection Technology for Steel-intensive Large Components with Complex Nodes Yang Shuangxi 22
- Analysis on the Failure Mechanism and Prevention Measures of Reflective Cracks in Asphalt Overlay on Old Cement Concrete Pavement Xiao Lixia 25
- Application of Pavement Disease Digital Detection Technology in Beijing–Taipei Expressway Reconstruction and Expansion Project Zhao Xu 28
- Research on the Digital Protection and Utilization of the Revolutionary Sites of Traditional Villages in Hunan* Deng Xiangyu, Sun Ming, Yi Lizhen 31

Engineering Technology and Application

- Research on Combined Construction Technology of the Hydraulic DTH Hammer and Rotary Drilling Rig under Hard Rock Boulder Geological Conditions
—Taking the Second Phase Construction Project of the Student Dormitory of Shantou University as an Example Wang Xiongxu 34
- Research on the Application of Magnetic Gradient Technology in Deep Buried Pipeline Detection Zhang Libo, Ren Panhong 37
- Research on Tunnel Expansion Construction Technology of Urban Subway Engineering Hu Qiufang 40
- Research on Anti-seepage Panel Construction Technology in Water Conservancy Dam Projects
—Taking Yantang Reservoir Project as an Example Wei Quan 43
- Analysis on the Application of High Strain Method in Foundation Pile Bearing Capacity Testing Wang Jiaman 46

Analysis on Construction Technology of Large-span Cast-in-place Cantilever Beam Hanging Baskets	Tao Yunde 49
Analysis on Technical Points of Rainwater and Sewage Pipe Network Construction in Municipal Engineering	Qin Han 52
Analysis on Technical Points and Application Measures of Foundation Construction in Housing Construction Engineering	Lin Yongbiao 55
Research on Construction Procedures and Key Technologies of Prefabricated Laminated Slabs in Prefabricated Buildings	Liao Jinxiang 58
Special Construction and Safety Management Analysis of Formwork Support for Main Structure of a Subway Station in Zhengzhou	Li Long 61
Application of UAV Tilt Photogrammetry Technology in Land Survey and Demarcation Work	He Zijian 64

Engineering Equipment and Materials

Research on Application of Advanced Geological Prediction Technology of Ground Penetrating Radar in Tunnels —Taking Zhaitang Tunnel Engineering as an Example	Huang Yiqin 67
Research on Preparation Technology of C30 ~ C50 Self-compacting Concrete	Li Fengwei, Sun Yi 70
Comparison of Construction Technology Between Walking Formwork Trolley and Traditional Wood Formwork in Pipe Gallery Project —Taking the Supporting Infrastructure Project in Jiangjun Area of Ezhou City as an Example	Liu Fangming, Cui Chenghua 75
Application of Composite Aluminum Alloy Formwork System in the Construction of Residential Buildings with Shear Wall Structure	Liu Ying 78
Application of Rotary Drilling Rig Construction Technology in High Altitude Sandy Cobble Stratum of Plateau	Sun Zhiyuan 81
Influence of Pier-Beam Connection Time on Mechanical Performance of High Steel Beam Portal Pier	Liu Bing 84
Research on Construction Technology of DTC Phase Change Temperature Self-regulating Asphalt Pavement in Alpine Mountainous Areas —Taking Gansu S232 Project as an Example	Wang Kun, Fu Ting, Zhou Longqiang, et al 87
Application Research on Reinforcement Construction Method of Shear Wall with Steel Mesh —Taking the "Tianji·Cihai Phase I" Project in Dongguan Eastern Industrial Park as an Example	Wang Yulong 90
Application of Stainless Steel Lining Repair Method in Water Supply Pipeline Construction of a Water Plant in Hanzhong	Wang Cunhan 93
Application of Removable Filters in Drainage Pipe Wells of Water Conservancy Projects	Deng Lei 96
Research on Steel Bar Loss Control Technology in Construction Engineering	Du Xuan, Wang Jianwei, Bai Lihui 99
Research on Anti-corrosion Coating Tooling Design of Wind Power Towers	Xia Yulong, Li Wen, Tang Bin 102

Engineering Management

Research on Contract Change and Claim Management of Wharf Engineering —Taking the Vibrating Gravel Pile Project of No. 36-No. 40 Coal Berth Wharf in Jingtang Port Area of Tangshan Port as an Example	Wu Zhenxing 105
Comparative Analysis of Sewage Pipe Network Project Cost under Different Charge Standards in Yunnan Province	Shang Zhengrong, Li Jiayu, Du Jiayao 108
Research on the Causes and Treatment Measures of Mass Concrete Cracks in Bridge Engineering Construction	Yuan Weicai 111
Analysis on Optimal Configuration of Municipal Water Supply and Drainage Pipe Network	He Yaning, Mu Fengyan 114
Research on Construction Cost Control of the Construction Project Based on BIM Technology	Li Yeyu 117
Analysis on Waterproof Construction of Subway Shield Segment Joints	Shen Zihe, Guo Yi, Wang Haonan, et al 120
Research on Existing Problems and Countermeasures in Construction Management of Housing Construction Projects	Wang Lei 123

Analysis on Problems and Quality Control of Municipal Water Supply and Drainage Construction	Kang Wenqing, Guo Xiaoguang	126
Application of Sponge City Concept in Urban Sewage Treatment Plant Construction Project	Wang Zhi	129
Research on Construction Control Measures to Improve Asphalt Pavement Evenness	Ye Bifen	132
Research on Treatment Measures of Diseases in Highway Drainage Facilities	Yuan Hongcheng	135

Engineering Education

The Practice Path of Gratitude Education in Higher Vocational Colleges in the New Era	Yin Guosheng, Liu Xiao	138
Research on the Importance of Library Digital Humanities Construction Indexes Based on the Perspective of Stakeholders	Luo Wenjing	141
Research on Monitoring and Early Warning System of Water Conservancy Project Based on Precipitation Allocation Battery	Lu Xinxiang, Li Xiaopeng	148

Engineering Design

Comparative Analysis on Design Schemes of Soil Nailing Support Considering the Influence of Expansive Soil —Taking an Expansive Soil Foundation Pit Project in Pingdingshan City as an Example	Yan Shentong	151
Design of Reconstruction and Expansion Scheme of Double-layer Stereoscopic Composite Expressway Interchange —Taking Changping-Humen and Dongguan-Shenzhen Expressway Reconstruction and Expansion Projects as Examples	Mei Bensheng, Yang Lizhen	154
Design of Rapid Production Scheme for Large-scale Topomap of Angduo Photovoltaic Power Station Area	Yang Liying	157
The Design of Bridge Decoration Engineering Along the Pearl River	Gao Mingying, Liang Mei	160
Analysis of Countermeasures for Municipal Engineering Construction Based on Drainage and Waterlogging Prevention Safety	Yang Juan, Zhang Hui, Qin Yue	163
Application of Ecological Revetment in the Design of Water Conservancy Projects	Rong Mengmeng	166
Analysis on Strategies for Improving the Design Level of Municipal Drainage and Waterlogging Prevention	Qin Yue, Yang Juan, Zhang Hui	169
Research on Smart Water Conservancy System Based on a Water System Connection Project	Li Ji	172
Research on the Architectural Design Scheme of Large-diameter Shield Tunnel Expanding Excavation Station	Han Hao, Zhang Zhigang, Dong Jiapeng, et al	175
Research on Route Selection Optimization of Expressways in Mountainous Areas	Bai Yunpeng	178
Discussion on Strengthening Measures for Optimizing Fire Protection Design in a Covered Commercial Pedestrian Street	Huang Qiang, Chen Yi	181

Development and Innovation

Analysis of Countermeasures for Reducing Survey Workload in Haojiang Beam-making Field in Guangdong Province	Sun Yuqi	184
Analysis on Influencing Factors and Prevention Measures of Soil and Water Loss in Industrial Park Solid Waste Disposal Site Project —Taking the Industrial Solid Waste Disposal Site Project in Zhongning County, Ningxia as an Example	Xie Tao, Feng Hailin, Ma Xiang	187
Analysis on Formation Conditions of High Concealed Geological Disasters in Dejiang County, Guizhou Province	Zhu Gang	190
Soil and Water Loss Analysis and Control Measures of a Breeding Farm in Wuzhong City	Ma Xiang, Xie Tao, Feng Hailin	193
Analysis of Current Situation and Improvement Measures of Air Quality in Underground Civil Air Defense Projects	Li Jing, Wang Bo, Han Xiaoxia, et al	196