

中国科学引文数据库 (CSCD) 核心期刊

中国科技论文统计源核心期刊

RCCSE 中国核心学术期刊

全国中文核心期刊



6

Q K 2 1 4 0 0 9 2 5



地下空间与工程学报

CHINESE JOURNAL OF
UNDERGROUND SPACE AND ENGINEERING

中国岩石力学与工程学会

重庆大学

主办



万方数据

Vol.17 Supp.1
2021年8月

地下空间与工程学报

第 17 卷增刊 1

(总第 134 期) 双月刊

2021 年 8 月

目次

· 地下空间开发利用 ·	
我国超大城市地下空间开发现状及其发展趋势	余苑航, 阎波(0001)
基于指数标度 AHP 的地下空间开发适宜性评价	段怡青, 解智强, 林美娜, 左小清, 侯至群(0008)
三亚市中心城区地下空间资源开发潜力评价	张航飞, 余绍文, 吴多誉, 王晓林, 杨永鹏(0016)
城际地下站公共空间使用效率预测与评价方法	陈彬彬, 蔡燕歆, 姚勇, 彭宪辉, 李昂(0022)
基于管线大数据的安全隐患分布时空模型构建	陈小平, 吴思, 高倩影, 张芳, 王明洋(0034)
· 理论与试验研究 ·	
双峰顶隧道穿越松散岩体注浆加固试验研究	雷尊贵, 张松涛, 陈培冲(0040)
南京地区大直径后注浆嵌岩桩静载荷试验研究	安康, 刘晔, 刘少林(0046)
临海复合盐碱地层顶管润滑泥浆性能试验研究	王剑锋(0055)
拉力型锚杆锚固体应力分布规律的现场试验研究	刘小斌, 李兆锋, 泰培, 陈锐, 付文光(0063)
苏州地下管廊余湿强度的试验研究	王亮, 宋翠翠, 赵文杰, 何国青(0071)
振动辅助式静力触探可行性试验研究	周长瑞, 聂细江, 李连营, 马乐民(0077)
加速度积分位移方法影响因素与可靠性研究	王体强, 王永志, 袁铭晓, 段雪锋, 汤兆光(0082)
桩前约束型填方边坡支护结构模型试验研究	王凯, 王飞, 林晓同, 吴发源, 唐骏逸(0089)
地铁车站深通风竖井围岩压力模型试验研究	史宁强, 靳晓光, 史作璟, 童晨材, 邱锋(0095)
长大地铁区间隧道双压通风模型实验与模拟	赵淑云, 程学友, 朱祝龙, 陈世强(0101)
不同盐岩组成含量对盐岩溶解速率影响规律研究	垢艳侠, 完颜祺琪, 李康, 冉莉娜(0108)
正交型裂隙岩石单轴压缩作用下的能量演化规律	武旭, 郭宇明, 孙景来, 郭林峰, 王新灵(0114)
不同强度土体的标贯能量比特征	刘金森, 廖先斌(0120)
基于 CFD 的盾构同步注浆填充扩散运动力学分析	李培楠, 英旭, 石来, 俞登华(0126)
深部油气井固井水泥冲击破坏中的应变率效应	陈立超, 王生维, 张典坤(0133)
预应力鱼腹梁钢支撑控制围护桩变形理论研究	胡廖琪(0141)
超大直径盾构隧道约束随机场建模及分析研究	程利力, 陈睿, 魏林春, 郭健(0150)
南昌地铁饱和含泥砂土动力特性模拟分析	胡小荣, 蔡晓锋, 李春博, 刘操(0157)
基于体积膨胀法的颗粒热固结 DEM 模拟分析	涂冬媚, 杨磊, 吴则祥, 卢声亮, 龚礼岳(0174)
地下商业街超浅埋暗挖法拱顶结构变形计算分析	刘飞, 王辉明, 李欢秋, 黄旭(0180)
基坑群间有限土压力及支护结构相互作用研究	邵鹏, 朱春柏, 潘静杰, 刘念武(0187)
地铁车站通风竖井围岩侧压力特征及拐点预测	史宁强, 史作璟, 童晨材, 邱锋, 靳晓光(0196)
岩溶天坑降雨积水水头边界估算方法	王占强, 李唐军, 万飞(0203)
· 设计、施工、监测 ·	
竹缠绕管廊工程设计及应用研究	叶铃, 孙元平(0209)
地下式污水处理厂关键节点及设计对策	刘世德, 王泽明, 刘茜, 高伟, 张怡(0215)
急曲线超大直径盾构隧道设计关键技术研究	由广明, 温竹茵, 刘念, 侯剑锋(0221)
深基坑无支撑支护前排倾斜双排桩设计与应用分析	张松波, 赖国梁, 宋志, 田野, 滕峰(0228)
Φ15.80 m 泥水平衡盾构主要推进阻力特征分析	孙飞祥, 孙振川, 张兵, 杨振兴, 郝超超(0235)

拼装式矩形顶管力学特性数值模拟研究	任兆丹,陈伟超(0241)
地铁隧道底覆盖型岩溶场地注浆加固关键技术	温忠义,彭卫平,张鹏,张庆华(0247)
浅埋扁平排水隧道侧穿高压杆塔加固技术研究	柯文汇,黄正新(0253)
山地城市超长供水隧洞快速施工工法比选	李启文,任联玺,梁宁慧,钟祖良,杨庆辉(0261)
呼和浩特市地铁与基坑十字交叉工序选择研究	英红,张锐,张宏,皇甫波(0269)
特长公路隧道变截面施工围岩-支护特性研究	乔世范,蔡子勇(0275)
砂岩隧道全断面光面爆破一次成形技术研究	陈玉,黄国栋,马龙浩,李晨,任松(0283)
盾构重叠隧道极小间距侧穿居民楼施工案例	谭伟姿(0291)
地铁车站双侧壁导坑法核心岩解除长度研究	刘涛,王海鸿,朱文会,吴祥祖,靳晓光(0299)
桩顶设置斜撑在深基坑多级支护中的应用	田野,宋志,张松波,张涛,张晋华(0304)
地铁超深地下连续墙槽壁稳定性综合化数值仿真	殷超凡,邓稀肥,王圣涛,赵高峰(0312)
基于神经网络算法的深基坑地连墙变形动态预测	赵华菁,张名扬,刘维,史培新(0321)
基于物联网与 WebGIS 的深基坑在线监测平台研究	张阳,张国永,李吉庆,曹玉明,郝宝诚(0328)
大直径顶管刀盘扭矩实测数据分析及控制技术	杨天鸿(0337)
泡沫性能测试及其在富水砂层渣土改良中应用	徐琳琳,余金,蒋亚龙,朱碧堂(0345)
杂填土与软土互嵌变形特性试验法及适用性分析	张福海,陈良,白岩辉,王远航,周天宝(0354)
防灾与环境	
含石量对砂卵石地层隧道开挖地表沉降影响研究	宋伟涛,张佩,杜修力(0359)
浅覆土砂卵石地层盾构施工地表沉降规律研究	杨志勇,谢文达,高洪吉,孙正阳,孙伟(0367)
盾构近距离下穿矩形顶管隧道施工变形规律研究	张林(0375)
基于 GA-BP 神经网络的黄土高填方工后沉降预测	朱建民,于永堂,郑建国,黄鑫(0382)
邻近基坑开挖地铁隧道的注浆保护试验与数值模拟	郦亮,刘干斌,陆幸,叶俊能,黄强(0387)
基底花岗岩残积土软化影响及变形控制研究	高彦(0397)
深部围岩蠕变特性对巷道稳定性影响数值模拟	丁增,张奇明,王恩元,冯小军,陈涛(0404)
深井软岩巷道底鼓变形破坏机理及控制技术	王羽扬,刘勇,王沉,韩连昌,冷光海(0411)
公路隧道衬砌裂缝稳定性的多因素影响分析	赵伟,黄瑞,曾彬,彭念,寇鸿斌(0419)
隧道近距离下穿建筑的设计安全控制方法探讨	幸芊(0426)
地下洞室群整体安全系数计算方法与工程应用	吴家耀,曹爱武,刘加进,褚卫江,孟国涛(0433)
基于 AHP-Fuzzy 的隧道穿富水断层破碎带突水涌泥评估	卢庆钊(0439)
叠线盾构隧道并行下穿燃气管线影响分析	沈俊,晏莉,傅金阳,阳军生(0449)
川西高原公路隧道中间段节能照明标准研究	李琦,陈茗洋,曹雄智,谢文静,杨畅(0457)
改扩建地下人防隧道通风除尘技术实践	朱爱山,周慧鹏(0463)
隧道渐扩段火灾纵向排烟关键参数研究	蒋天驰,朱凯,黄亚东,李海航,吴珂(0469)
基于 CFD 技术的毗邻隧道污染物窜流特性研究	李杰,刘振撼,彭俊钦,曾艳华,彭康夫(0474)
火灾下复合管片钢板厚度对温度场分布的影响	张稳军,上官丹丹,王祎,张高乐(0485)
分节预制地连墙结构基坑稳定与结构受力研究	黄栩,刘小荣,刘念武(0491)
锚索在某核电工程深基坑加固中的应用研究	胡瑞,李竹青(0498)
750 m 级特高陡岩质边坡稳定性分析及整治技术	王昆,张宗亮,张嘎,吴学明,徐云泉(0504)
可回收锚杆技术研究综述	付文光,邹俊峰,黄凯(0512)
地铁区间隧道施工对古城墙的影响评估研究	杨强义,王菲(0523)

CONTENTS

Present Situation and Development Trend of Underground Space in Megacity in China Yu Yuanhang, Bo Yan(0001)

Suitability Evaluation of Underground Space Development Based on Index Scale-AHP Duan Yiqing, Xie Zhiqiang, Lin Meina, Zuo Xiaoqing, Hou Zhiqun(0008)

Potential Assessment of the Development of Underground Space Resources in Downtown Sanya City Zhang Hangfei, Yu Shaowen, Wu Duoyu, Wang Xiaolin, Yang Yongpeng(0016)

Method for Forecasting and Evaluating Public Space Utilization Efficiency of Intercity Underground Stations Chen Binbin, Cai Yanxin, Yao Yong, Peng Xianhui, Li Ang(0022)

Temporal and Spatial Model Construction of Security Potential Hazards Distribution Based on Pipeline Big Data Chen Xiaoping, Wu Si, Gao Qianying, Zhang Fang, Wang Mingyang(0034)

Study on Grouting Reinforcement of Twin-peak Tunnel through Loose Rock Mass Lei Zungui, Zhang Songtao, Chen Peichong(0040)

Experimental Study on Large Diameter Post-grouting Rock-socketed Piles in Nanjing Using the Method of Static Loading Test An Kang, Liu Ye, Liu Shaolin(0046)

Experimental Study on the Performance of Pipe Jacking Lubrication Mud in the Coastal Complex Salinized Layer Wang Jianfeng(0055)

In-situ Experimental Investigation on Stress Distribution of Grout Body of Tension-type Ground Anchor Liu Xiaobin, Li Zhaofeng, Tai Pei, Chen Rui, Fu Wenguang(0063)

Experimental Study on the Moisture Load of an Urban Utility Tunnel in Suzhou Wang Liang, Song Cuicui, Zhao Wenjie, He Guoqing(0071)

Experimental Study on the Feasibility of Vibration Assisted CPT Zhou Changrui, Nie Xijiang, Li Lianying, Ma Leming(0077)

Influencing Factors and Reliability Study on Double Integral of Acceleration Measurement for Displacement Wang Tiqiang, Wang Yongzhi, Yuan Xiaoming, Duan Xuefeng, Tang Zhaoguang(0082)

Test Study on the Pre-pile-restrained Type Pile-plate of Support Structure Wang Kai, Wang Fei, Lin Xiaotong, Wu Fayuan, Tang Junyi(0089)

Physical Model Test Study on Surrounding Rock Pressure of Rectangular Deep Ventilation Shaft in Metro Station Shi Ningqiang, Jin Xiaoguang, Shi Zuoqing, Tong Chencai, Qiu Feng(0095)

Simulation and Experiments of Two Pressing-in Ventilation System in a Subway Interval Tunnel Zhao Shuyun, Cheng Xueyou, Zhu Zhulong, Chen Shiqiang(0101)

Study on the Influence of Different Salt Rock Composition and Content on the Dissolution Rate of Salt Rock Gou Yanxia, Wanyan Qiqi, Li Kang, Ran Lina(0108)

Energy Evolution of Orthogonal Cracked Rock under Uniaxial Loading Wu Xu, Guo Yuming, Sun Jinglai, Guo Linfeng, Wang Xinling(0114)

Energy Ratio Characteristics of Standard Penetration Test for Soils with Different Strength Liu Jinsen, Liao Xianbin(0120)

Hydrodynamics Analysis on Fill Diffusion in Shield Synchronous Grouting Based on CFD Li Pennan, Ying Xu, Shi Lai, Yu Denghua(0126)

Strain Rates Effect on the Impact Fracture of the Cement Sheath in Deep Oil and Gas Wells Chen Lichao, Wang Shengwei, Zhang Diankun(0133)

Theoretical Study of the Deformation Control of Retaining Piles by Steel Support of Prestressed Fish-bellied Beams Hu Liaoqi(0141)

Constraint Random Field Modeling and Analysis of Super Large Diameter Shield Tunnel Cheng Lili, Chen Rui, Wei Linchun, Guo Jian(0150)

Numerical Simulations of Dynamic Characteristics for Saturated Compacted Clayey Sands in Nanchang Metro Hu Xiaorong, Cai Xiaofeng, Li Chunbo, Liu Cao(0157)

DEM Simulation Analysis on Particle Thermal Consolidation Based on Volume Expansion Method Tu Dongmei, Yang Lei, Wu Zexiang, Lu Shengliang, Gong Liyue(0174)

Numerical Analysis of Ultra-shallow Buried Excavation Method in Underground Commercial Street Liu Fei, Wang Huiming, Li Huanqiu, Huang Xu(0180)

Study on the Interaction of Limited Earth Pressure and Supporting Structure between Deep Foundation Pits Shao Peng, Zhu Chunbai, Pan Jingjie, Liu Nianwu(0187)

Lateral Pressure Characteristics of Surrounding Rock and Inflection Point Prediction of Ventilation Shaft in Subway Station Shi Ningqiang, Shi Zuoqing, Tong Chencai, Qiu Feng, Jin Xiaoguang(0196)

Estimation Method of Rainwater Head Boundary of the Karst Sinkhole Wang Zhanqiang, Li Tangjun, Wan Fei(0203)

Design and Application of Bamboo Winding Utility Tunnel Ye Ling, Sun Yuanping(0209)

Key Nodes and Design Countermeasures of Underground Sewage Treatment Plant Liu Shide, Wang Zeming, Liu Qian, Gao Wei, Zhang Yi(0215)

Research on the Key Technology of the Design of the Small-radius Curved Shield Tunnel You Guangmin, Wen Zhuoyin, Liu Nian, Hou Jianfeng(0221)

Design and Analysis of Retaining Structure in Deep Foundation Pit by Using Double-row Contiguous Piles with Raking Front-row Piles Zhang Songbo, Lai Guoliang, Song Zhi, Tian Ye, Teng Feng(0228)

Characteristics Analysis of Main Resistance Force for $\Phi 15.80$ m Slurry Balance Shield Sun Feixiang, Sun Zhenchuan, Zhang Bing, Yang Zhenxing, Hao Chaochao(0235)

Numerical Study on Mechanical Behavior of Assembled Rectangular Pipe Jacking Ren Zhaodan, Chen Weichao(0241)

Key Technology of Grouting Reinforcement in Covered Karst Strata at the Bottom of Existing Subway Tunnel Wen Zhongyi, Peng Weiping, Zhang Peng, Zhang Qinghua(0247)

Research on Reinforcement Technology for a Shallow Flat Drainage Tunnel Passing through a High-voltage Pole Ke Wenhui, Huang Zhengxin(0253)

Selection and Comparison of Rapid Construction Methods for Ultra-long Distance Water Supply Tunnels in Mountain Cities	Li Qiwen, Ren Lianxi, Liang Ninghui, Zhong Zuliang, Yang Qinghui(0261)
Study on Selection of Cross Procedures between Subway and Foundation Pit in Hohhot City	Ying Hong, Zhang Rui, Zhang Hong, Huang Fubo(0269)
Study on the Characteristics of Surrounding Rock-Support in Variable Cross Section Construction of Extra-long Highway Tunnel	Qiao Shifan, Cai Ziyong(0275)
Study on One-time Forming Technology of Full-face Smooth Blasting in Sandstone Tunnel	ChenYu, Huang Guodong, Ma Longhao, Li Chen, Ren Song(0283)
Case Study of Overlapped Shield Tunnels Passing Buildings in Very Close Proximity	Tan Weizi(0291)
Study on the Release Length of Core Rock in Double-side Guide Pit Construction of Deep Underground Station	Liu Tao, Wang Haihong, Zhu Wenhui, Wu Xiangzu, Jin Xiaoguang(0299)
Application of Setting Inclined Support on Pile Top in Multistage Support of Deep Foundation Pit	Tian Ye, Song Zhi, Zhang Songbo, Zhang Tao, Zhang Jinhua(0304)
Trench Stability Analysis of Ultra-deep Diaphragm Wall in the Subway Station through Comprehensive Numerical Simulation	Yin Chaofan, Deng Xifei, Wang Shengtao, Zhao Gaofeng(0312)
Dynamic Prediction of Diaphragm Wall Deflection Caused by Deep Excavation Using Neural Network Algorithm	Zhao Huajing, Zhang Mingyang, Liu Wei, Shi Peixin(0321)
Study on Online Monitoring Platform of Deep Foundation Pit Based on Internet of Things and WebGIS	Zhang Yang, Zhang Guoyong, Li Jiqing, Cao Yuming, Hao Baocheng(0328)
Measured Data Analysis and Controls on Cutter head Torque of the Large Diameter Pipe Jacking Machine	Yang Tianhong(0337)
Testing of Foam Properties and Its Application in Soil Conditioning for Water Bearing Sandy Grounds	Xu Linlin, Yu Jin, Jiang Yalong, Zhu Bitang(0345)
Test Method for Mutually Embedded Settlement between Fill and Soft Soil and Its Applicability	Zhang Fuhai, Chen Liang, Bai Yanhui, Wang Yuanhang, Zhou Tianbao(0354)
Research on the Influence of Stone Content on Surface Settlement Caused by Tunnel Excavation in Sandy Cobble Stratum	Song Weitao, Zhang Pei, Du Xiuli(0359)
Study on Ground Settlement Caused by Shield Construction in Shallow Buried Sand and Pebble Stratum Condition	Yang Zhiyong, Xie Wenda, Gao Honhji, Sun Zhengyang, Sun Wei(0367)
Research on Deformation Laws of Rectangular Pipe Jacking Tunnel due to Shield Tunnelling beneath in Close Vicinity	Zhang Lin(0375)
Prediction of Post-construction Settlement of High Loess-filled Based on GA-BP Neural Network	Zhu Jianmin, Yu Yongtang, Zheng Jianguo, Huang Xin(0382)
Grouting Protection Test and Simulation of Underground Tunnel near Foundation Pit Excavation	Li Liang, Liu Ganbin, Lu Xing, Ye Junneng, Huang Qiang(0387)
Study on Softening Effect and Deformation Control of Basement Granite Residual Soil	Gao Yan(0397)
Numerical Simulation of the Influence on Creep Characteristics about Roadway Stability in Deep Surrounding Rock	Ding Zeng, Zhang Qiming, Wang Enyuan, Feng Xiaojun, Chen Tao(0404)
Mechanics of Bottom Bulge and Control Technology in Deep Mine Soft Rock Roadway	Wang Yuyang, Liu Yong, Wang Chen, Han Lianchang, Leng Guanghai(0411)
Multivariate Analysis on the Stability of Lining Cracks of Highway Tunnel ...	Zhao Wei, Huang Rui, Zeng Bin, Peng Nian, Kou Hongbin(0419)
Discussion on Design Safety Control Method of Tunnel Passing Through Building in Short Distance	Xing Qian(0426)
Method for Calculation Overall Safety of Factor of Underground Cavern Complex and Its Application	Wu Jiayao, Cao Aiwu, Liu Jiajin, Chu Weijiang, Meng Guotao(0433)
Risk Assessment of Water and Mud Inrush in Tunnel Crossing Water-rich Fault Fracture Zone Based on Aup-Fuzzy	Lu QingZhao(0439)
Influence Analysis of Parallel Underpass Gas Pipeline of Overlapped Shield Tunnel	Shen Jun, Yan Li, Fu Jinyang, Yang Junsheng(0449)
Study on Energy-saving Lighting Standard for Interior Zone of Highway Tunnel in Western Sichuan Plateau	Li Qi, Chen Mingyang, Cao Xiongzhi, Xie Wenjing, Yang Chang(0457)
Practice of Ventilation and Dedusting Technology for the Reconstruction and Extension of Underground Civil Air Defense Tunnel	Zhu Aishan, Zhou Huipeng(0463)
Key Parameters of Smoke Control under Longitudinal Ventilation in Tunnel's Expanding Section	Jiang Tianchi, Zhu Kai, Huang Yadong, Li Haihang, Wu Ke(0469)
Pollutants Crossflow Research of Adjacent Tunnels Based on CFD Technology	Li Jie, Liu Zhenhan, Peng Junqin, Zeng Yanhua, Peng Kangfu(0474)
Effect of Thickness of Composite Segment Steel Tubular on Temperature Field Distribution under Fire	Zhang Wenjun, Shanguan Dandan, Wang Yi, Zhang Gaole(0485)
Research on the Stability of Excavation and Structural Behaviour for Segmental Pre-cast Diaphragm Wall Structure	Huang Xu, Liu Xiaorong, Liu Nianwu(0491)
Application of Anchor Cable in the Reinforcement of Deep Foundation Pit of Nuclear Power Project	Hu Rui, Li Zhuqing(0498)
Stability Analysis and Treatment Technology of 750 m-level Extra High and Steep Rock Slope	Wang Kun, Zhang Zongliang, Zhang Ga, Wu Xueming, Xu Yunquan(0504)
Overview of Research on Recycled Anchor Technology	Fu Wenguang, Zou Junfeng, Huang Kai(0512)
Research on the Impact Assessment of Metro Tunnel Construction on Ancient City Wall	Yang Qiangyi, Wang Fei(0523)

武汉广益交通科技股份有限公司

武汉广益交通科技股份有限公司是国家高新技术企业，主要从事土木交通科学技术研究、咨询；工程项目管理；公路工程、市政工程、工业与民用建筑工程施工监理；机电照明设计及工程施工；地基基础及装饰工程施工；建筑材料批发兼零售；公路水运工程、土木工程综合试验检测。

公司自2001年成立以来，已取得授权的国家发明专利技术16项、实用新型专利技术21项，已申报正在公示待授权的国家发明专利技术12项；截至到目前，公司已获得各类荣誉35项，已获中国土木工程詹天佑奖2项，交通运输部李春奖1项，中国技术市场金桥奖1项，中国专利奖2项，省（部）级科技进步“一等奖”1项、“二等奖”10项、“三等奖”5项；公司牵头主编和参与编制完成的省部级行业规范、标准17部，在一系列国家重点工程项目建设中取得了优异的成绩，公司具有“武汉市工程技术研究中心”、其控股公司安徽中益新材料科技有限公司具有“安徽省高层次人才创新团队”“安徽省建筑节能与安全防灾院士工作站”和全国交通运输科普基地“道路绿色照明与安全防灾新材料试验室”等科技创新和研发平台。

◆多功能储能式发光材料

“中益阳光牌”多功能储能式发光材料主要用于公路隧道、地下综合管廊、城市轨道交通、民防、军事以及工民建等领域的安全防灾与节能、引导照明，系列产品包括：多功能储能式发光涂料、多功能储能式发光反光道路标志牌、多功能储能式发光反光轮廓标、多功能储能式发光反光环、多功能储能式发光反光突起路标、多功能储能式隧道拱顶诱导标。

● 多功能储能式发光涂料具有防火阻燃、增光增亮、延时发光、耐腐蚀、耐污染、抗霉菌、自洁净和释放负离子的性能，在隧道与地下工程中应用可明显提高暗环境的照明亮度，提高道路照明均匀度，提高小物体的可视距离，改善照明光环境的舒适性，提供紧急逃生指示照明及提高地下工程的空气环境质量。

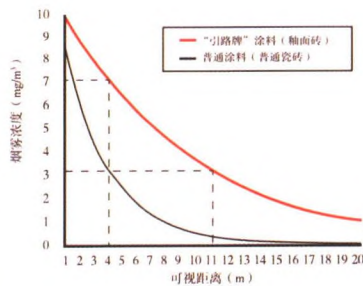
● 多功能储能式发光反光道路标志牌、轮廓标、突起路标、隧道反光环及拱顶诱导标，在道路上使用，既可逆反射诱导安全行车又能在暗环境中起到指示和引导照明的作用。



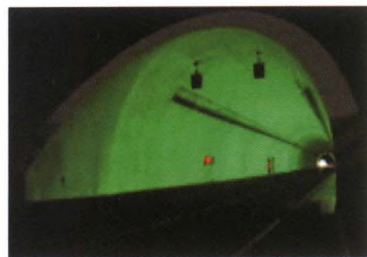
a “中益阳光”灯下透烟



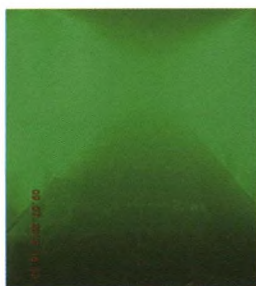
b 普通涂料灯下透烟



多功能储能式发光涂料烟雾穿透力试验



“中益阳光牌”涂料延时发光辅助照明



c 熄灯后“中益阳光”透烟



d 熄灯后普通涂料状态



交通运输部建设科技成果推广证



2018 年度 ITA 技术产品 / 设备创新奖

◆抗冻防腐添加剂

“引路牌”抗冻防腐添加剂主要用于季冻、寒区隧道的消防，系水性抗冻防腐添加剂取消防水池中的消防水，其灭火效果好，在-50℃不结冰，对消防管道、设施和混凝土及周边环境无腐蚀、无污染，在隧道消防工程中应用，可达到节能、环保、减少建设和维护费用及无安全隐患的目的。

地 址：武汉市东湖新技术开发区SBI创业街10栋A座25楼 邮 编：430074
安徽省滁州市全椒十谭产业园光辉大道31号 邮 编：239500
电 话：027-87458105 0550-5280700 传 真：027-87803041 0550-5280700
网 址：www.gytst.com 邮 箱：gytst@gytst.com
联系人：高先生 13995528967 李女士 13307191113 屈女士 15827490915

国际标准连续出版物号 ISSN 1673-0836

国内统一连续出版物号 CN50-1169/TU

国内外公开发行

邮发代号：78-253

封面题字：钱七虎

封面设计：符宗荣

定价：150.00元

ISSN 1673-0836



9 771673 083218

9 9>