

全国中文核心期刊
中国科技核心期刊
RCCSE中国核心学术期刊

■中国学术期刊综合评价数据库统计源期刊 ■中国知网 中国学术期刊网络出版总库全文收录
■中国科技期刊精品数据库收录 ■美国《化学文摘》《乌利希期刊指南》收录 ■俄罗斯《文摘杂志》收录

煤矿安全

SAFETY IN COAL MINES

ISSN 1003-496X
CN 21-1232/TD

9
2018

Vol. 49 No. 9

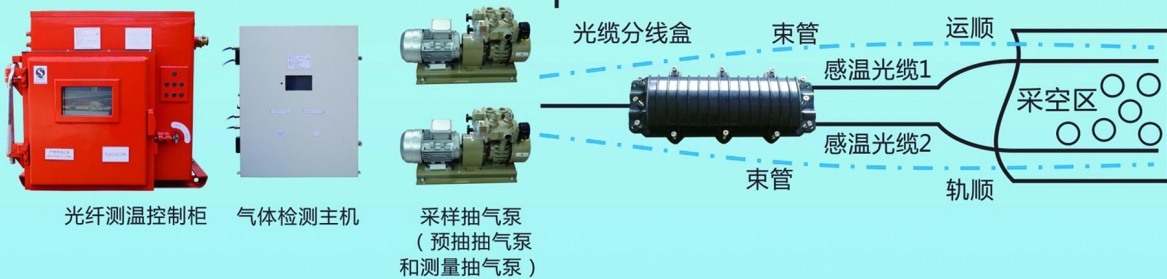
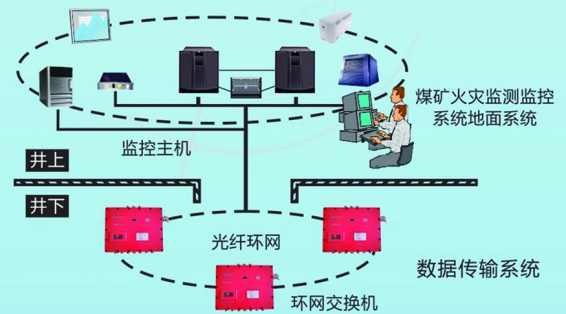
煤科集团沈阳研究院有限公司

主办

1970年创刊·月刊

GLTECH
光力科技
股票代码: 300480

矿用分布式激光火情监测系统



- ◎ 火最完善的火灾预测模型，包含温度、CO、CH₄、C₂H₄、C₂H₂、O₂、CO₂，集分布式光纤传感和激光多气体检测技术为一体。
- ◎ 气体检测采用高分辨率激光吸收光谱技术，消除气体交叉干扰，测量不受粉尘、水汽的影响。
- ◎ 温度检测采用光纤传感技术，本质安全，铺设简单，无需维护，测量准确，可对采空区发火点精确定位。
- ◎ 本地实时连续测量，响应速度快，不受管路影响。

ISSN 1003-496X



WWW.GLTECH.CN

TEL: 0371-6785 8887 E-MAIL: info@gltech.cn CSH: 400-0057-577

ADD: 郑州高新技术产业开发区长椿路十号

2018·09

煤矿安全

第49卷总第531期

煤矿安全[®]

MEIKUANG ANQUAN

月刊(1970年创刊)

2018年9月

第49卷第9期(总第531期)

主管单位

煤科集团沈阳研究院有限公司

主办单位

煤科集团沈阳研究院有限公司

主 编 罗海珠
副 主 编 梁绍权
编辑部主任 王福厚
广告发行主管 刘明智

出版单位 《煤矿安全》编辑部
地 址 辽宁省抚顺市经济开发区
滨河路11号
邮政编码 113122

电 话 (024)56616988 56616987
56616981 56613526

电子信箱 mkaq@163.com
mkaqgg@163.com(广告)

网 址 www.mkaqzz.com

发行范围 公开发行

发行单位 《煤矿安全》编辑部
或全国各地邮局

邮发代号 8-293

印刷单位 煤炭科学研究总院抚顺分院
胶版印刷厂

中国标准连续出版物号 ISSN 1003-496X
CN 21-1232/TD

企业法人营业执照注册号 210400000026129

商标注册证 第1144537号

出版日期 9月20日

定 价 20.00元

北京联络处 (010)64464228



“煤传媒”微信公众号



《煤矿安全》微信公众号

万方数据

目 次

试验·研究

粒径和吸附平衡压力对无烟煤残存瓦斯含量的影响 陈向军,李立杨,杜云飞,刘洋(1)
外水侵入对受载含瓦斯煤解吸的影响 柳晓莉,阚瞳,刘康(6)
基于晶格理论模型煤的瓦斯吸附性能预测 郑新军,岳高伟,霍留鹏,曾春林(10)
煤体吸附瓦斯过程温度场变化实验研究 马月彬,董利辉,赵越超,李光耀(14)
砂岩轴向预制裂缝的起裂和扩展规律试验研究 冯帆,杨录胜,刘正和,申凯(18)
三维采空区煤层气渗流空间分布特征及应用

张□,胡胜勇,冯国瑞,程健维,郝国才,韩丹丹,关舒文(22)

煤层气井固井水泥的初步探究

王胜,徐世桐,汪靖扉,蒋贵,华绪,郭凯彬,赵蒙(27)

含瓦斯型煤吸附/解吸特性研究 岳基伟,王兆丰,谢策,岳高伟,祁晨君(31)

燃烧温度对两淮烟煤中汞含量与赋存形态的影响 王德高,李江涛,梁文勳(35)

煤层注水起裂压力及浸润扩散距离试验研究 王海(41)

离子液体对煤官能团种类及含量的影响 苗梦露,张卫清,蒋曙光(44)

弱黏煤氧化过程中的燃点及微观结构变化特征研究 杨波,王坤,艾兴(48)

神东北部矿区水浸煤自燃标志气体产生规律 王亚超(52)

高强度相似材料配比试验研究 杨洪增,赵章,李玉宝(59)

基于剩余能量释放率指标的组煤岩体冲击倾向性研究 付玉凯(63)

煤矿分布式地下水煤柱坝体合理布置方式 吴宝杨(68)

端部摩擦作用对砂岩尺寸效应影响的试验 魏继祖,梁芳敏,闫石,李湖滨,闫自刚(73)

下保护层开采覆岩移动规律研究 卫成相(79)

层状岩体隧道底鼓非对称变形研究 王焱,翁梅(83)

基于核磁共振技术的花岗岩三轴压缩峰前裂隙发育及损伤规律研究

章亮,任奋华,韩猛,杨壮,孙翊程,刘康(87)

近距煤层群不同层间岩层结构下围岩裂隙演化规律 张春雷,李占平,康强(91)

掺粉煤灰水泥基浆液性能关系模型研究 顾明晖,黄金坤,庞建勇,张金松(96)

技术·创新

大采高采场“U”型通风系统采空区大流量瓦斯抽采技术 徐玉胜,李春元,张勇(100)

特厚煤层综放工作面过斜交正断层冲击矿压防控技术

焦彪,冯龙飞,贺海鸿,史星星,田晓兵,杨力(105)

顶板高位定向钻孔无线随钻测量定向钻进技术及应用 任海慧,李泉新,方俊(110)

预应力全长复合锚固及锚注一体化综合支护技术及工程应用

邵德盛,杨永刚,李世辉,杨张杰(114)

深井高瓦斯碎裂软岩底抽巷围岩控制技术

何富连,赵勇强,武精科(118)

老虎台矿高应力煤柱区巷道掘进冲击地压防治技术

王福军,李先志(122)

设计·开发

斜直井钻机在煤层气水平井中的应用 赵社友,张永成(124)

一种煤矿井下定向钻进循环用水工艺 肖丽辉,陈鱼,孔伟,潘小叶(128)

煤层气车载钻机动力系统匹配研究 鲁飞飞(131)

大平煤矿安全监控系统风电瓦斯闭锁的实现 罗正时(135)

矿用隔离开关无刷直流电机机构设计和电磁仿真分析 张红奎,李丹,李亚林(138)

岱庄煤矿双向防水闸门硐室及自动控制系统设计 孙焕钊,王尧,郭亚兰(141)

基于单片机控制的矿用大电流高稳定数字本安电源

张天兴,夏春华,刘艺平,邱选兵,曹龙山(144)

潘二矿粉煤灰节水充填系统

常泽超,王志军,郑晓东,张源(148)

基于光纤光栅技术的锚杆切向载荷定量测试研究 刘中熙,李志宏,郝兵元(152)

液压支架工作阻力监测和数据处理在Excel中的实现 王爱午,关永新,孙浩(157)

期刊基本参数:CN 21-1232/TD * 1970 * m * A4 * 312 * zh * p * ¥20.00 * □ * 74 * 2018-09

《煤矿安全》杂志唯一投稿平台:

www.mkaqzz.com



投稿流程:



查稿流程:



注: 投稿请用IE浏览器

本刊声明:

- ☆ 本刊所有来稿自投稿之日起3个月内未收到“稿件采用通知书”, 作者可另行处理, 在此之前请勿一稿多投。
- ☆ 根据编辑加工原则, 本刊可能会对采用的稿件进行必要的删改, 不同意删改的, 请在投稿时声明。
- ☆ 本刊有出电子版、网络版、与网站技术交流和与各数据库合作的权利, 作者著作权使用费(包括上述几种方式), 并与本刊稿酬一次性付清。如作者不同意将文章以上述形式收录, 请在来稿时声明。

基于 LoRa 的固定式罐道间距测量仪 史发钊, 尤星懿, 李亚璇, 刘淑婷(160)
 基于窄带物联网的罐道间距测量仪 徐洋, 段双双, 王贞宝, 崔雪微, 胥玉传(163)

应用·实践

鹤岗矿区煤与瓦斯突出影响因素分析及防治方法 谭永福(167)
 冲击地压条件下矿井疏排水系统设计 盛超, 张鸥, 许德新(171)
 松软煤层大采高工作面深孔注浆加固技术 张江利, 陶广美(175)
 定向钻进技术在张集煤矿掩护巷道掘进探放水中的应用

豆旭谦, 魏廷双, 王力, 徐保龙(179)
 榆阳煤矿综采充填柔模密闭墙设计与施工 陈拓其, 党西峰(183)
 基于新型注浆加固材料的工作面过破碎断层措施 张喜传, 周玉军, 张海波(187)
 特厚强冲煤层下分层开采防冲击优化设计 屈英, 乔中栋, 李守锋, 苏仁元(190)

分析·探讨

平煤十一矿艾山逆断层瓦斯异常区范围划定研究 雷东记, 薛群山, 张玉贵, 孟慧(194)
 孤岛工作面瓦斯释放影响因素分析及预抽必要性论证 邹银辉, 程建圣, 张锋, 赵凯(198)

基于 VBA 的煤储层参数反演模型 曹石榴, 雷光宇(202)
 基于 COMSOL 数值模拟的液态 CO₂ 相变致裂布孔参数优化 张柏林, 李豪君, 张兴华(207)
 基于灰色理论-多元回归分析的瓦斯含量预测

许满贵, 高帅帅, 曹艳军, 卢亚楠, 王娇娇(211)
 基于区域防突措施效果检验过程的瓦斯含量测定方法探讨 张开加(215)
 掘进巷道粉尘运移扩散规律研究进展 丁翠(219)

后高抽立眼治理初期瓦斯的 CFD 模拟研究 李强, 仇海生(223)
 煤矿巷道含软弱夹层底板锚固孔钻进扩径现象研究 丁军, 罗亚飞(228)
 竖井爆破振动及 CO₂ 致裂振动信号的小波包分析 刘光辉, 王海亮, 吴钦鑫(233)

浅埋深首采工作面采空区“三带”分布规律 吕志金, 欧阳辉(238)
 基于 FTA 的近距离煤层群沿空切巷开采条件下自燃诱因分析 伍厚荣, 侯炳超, 万朝雄, 尹伟, 袁浩钦(242)

准格尔煤田岩溶水文地质特征及水害防治技术 李宏杰, 马君, 姜鹏, 黎灵, 郝志鹏(246)
 新疆大南湖七号煤矿顶板突水危险性评价与防治 吴晓军, 冯光俊, 高海涛, 刘景(252)
 褶曲构造对煤巷围岩破裂范围及动压影响分析 展亚太, 王金安, 李飞, 韩现刚(257)

基于多支架联合分析技术的顶板运动规律分析 徐军见, 郭江涛, 赵光绪, 卢向明, 李帅(262)
 高水平应力下大断面巷道围岩破坏机理及支护方案 郭良, 黄成麟, 张春雷(266)

特厚煤层坚硬顶板临空煤巷强矿压显现机理及控制技术 董合祥, 段宏飞, 王亚军(271)
 工作面推进速度对顶板覆岩活动的影响 梁东民, 池小楼(276)
 不规则工作面沉降预计三角剖分算法研究 张兵, 崔希民, 赵玉玲, 贺军亮(280)

基于采动应力分布的深部正断层工作面设计数值模拟 贾江锋, 束佳明, 马宁, 张臣(284)
 乌鲁木齐西山大蒲沟地面塌陷发育特征及治理措施 陈凯, 王文科, 王化兵, 张紫昭, 储春妹(289)

群体规范对矿工违章行为的作用机制研究 祁慧, 张明阳, 陈红(293)
 基于 WBS-RBS 的贵州某矿“一通三防”系统风险评估 李闯, 袁梅, 陈银, 王玉丽, 许石青, 张平(297)

矿井热动力灾害逃生影响因素研究 朱云飞, 王德明(301)
 一起井下雷管运输过程爆炸事故原因分析 秦培均(305)
 基于生理信号的照度水平对矿工影响研究 景国勋, 柴艺, 阚中阳(309)

基于生理信号的照度水平对矿工影响研究 景国勋, 柴艺, 阚中阳(309)

SAFETY in COAL MINES

Monthly(Started in 1970)

September 2018

Vol.49, No.9(Total 531)

Competent Authority

CCTEG Shenyang Research Institute

Sponsor

CCTEG Shenyang Research Institute

Chief Editor LUO Haizhu

Deputy Chief Editor LIANG Shaoquan

Editorial Director WANG Fuhou

Advertisement & Distribution LIU Mingzhi

Publisher Editorial Office of
《SAFETY in COAL MINES》

Address No.11 of Binhe Road, Fushun
Economic Developing-area, Liaoning, China

Post code 113122

Tel 86-24-56616988 56616987
56616981 56613526

E-Mail mkaq@163.com
mkaqgg@163.com(advertisement)

Website www.mkaqzz.com

Issuer Public Offering

Subscribe(to) Editorial Office of 《SAFETY in
COAL MINES》 or Local Post Offices

Postal Distribution Code 8-293

Printed by Offset Printing Factory of
Fushun Branch of CCRI

China Standard Serial
Numbering ISSN 1003-496X
CN 21-1232/TD

Business License No. 210400000026129

Trademark Registered
Certificate No.1144537

Publishing Date September 20

Price 20 yuan

Beijing Liaison Office 86-10-64464228

CONTENTS

Test·Research

- Influence of Coal Particle Size and Adsorption Equilibrium Pressure on Residual Gas Content of Anthracite **CHEN Xiangjun,LI Liyang,DU Yunfei,LIU Yang**(1)
- Effect of Water Intrusion on Gas Desorption of Loaded Coal Containing Gas **LIU Xiaoli,KAN Tong,LIU Kang**(6)
- Prediction of Gas Adsorption Performance Based on Lattice Theory Model **ZHENG Xinjun,YUE Gaowei,HUO Liupeng,ZENG Chunlin**(10)
- Experimental Research on Temperature Field Change During Coal Adsorbing Gas Process **MA Yuebin,DONG Lihui,ZHAO Yuechao,LI Guangyao**(14)
- Experimental Study on Initiation and Propagation Law of Sandstone with Axial Prefabricated Cracks **FENG Fan,YANG Lusheng,LIU Zhenghe,SHEN Kai**(18)
- Spatial Distribution and Application of Coalbed Gas Seepage in Three-dimensional Goaf **ZHANG Ao, HU Shengyong,FENG Guorui,CHENG Jianwei,HAO Guocai,HAN Dandan,GUAN Shuwen**(22)
- Research on Cementing in Coalbed Methane Well **WANG Sheng,XU Shitong,WANG Jingfei,JIANG Gui,HUA Xu,GUO Kaibin,ZHAO Meng**(27)
- Study on Adsorption and Desorption Characteristics of Briquette Coal Containing Gas **YUE Jiwei,WANG Zhaofeng,XIE Ce,YUE Gaowei,QI Chenjun**(31)
- Influence of Combustion Temperature on Mercury Content and Occurrence Form of Bituminous Coal in Huainan and Huaibei Regions **WANG Degao,LI Jiantao,LIANG Wenxu**(35)
- Experimental Study on Initiation Pressure and Water Diffusion Distance of Coal Seam by Water Injection **WANG Hai**(41)
- Influence of Ionic Liquids on Types and Content of Coal Functional Groups **MIAO Menglu,ZHANG Weiqing,JIANG Shuguang**(44)
- Study on Change Characteristics of Ignition Point and Microstructure in Oxidation Process of Weakly Caking Coal **YANG Bo,WANG Kun,AI Xing**(48)
- Production Laws of Mark Gases for Spontaneous Combustion of Water-soaked Coal in Northern Shandong Mining Areas **WANG Yachao**(52)
- Experimental Study on Ratio of High Strength Similar Materials **YANG Hongzeng,ZHAO Zhang,LI Yubao**(59)
- Study on Impact Tendency of Combined Coal and Rock Mass Based on Residual Energy Release Rate Index **FU Yukai**(63)
- Reasonable Arrangement Mode About Coal Pillar Dam of Distributed Groundwater Reservoir in Coal Mine **WU Baoyang**(68)
- Experiment on Influence of End Friction on Size Effect of Sandstone **WEI Jizu,LIANG Fangmin,YAN Shi,LI Hubin,YAN Zigang**(73)
- Research on Overlying Strata Movement of Lower Protective Seam Mining **WEI Chengxiang**(79)
- Asymmetric Deformation of Floor Heave in Layered Rock Mass Tunnel **WANG Yan,WENG Mei**(83)
- Development and Damage of Cracks in Front of Granite Triaxial Compression Peak Based on Nuclear Magnetic Resonance **ZHANG Liang,REN Fenhua,HAN Meng,YANG Zhuang,SUN Yicheng,LIU Kang**(87)
- Fracture Evolution Laws of Surrounding Rock Under Different Strata Rock Structures in Short Distance Coal Seam Group **ZHANG Chunlei,LI Zhanping,KANG Qiang**(91)
- Relational Model for Property of Cement-based Grout Mixed with Ultrafine Fly Ash **GU Minghui,HUANG Jinkun,PANG Jianyong,ZHANG Jinsong**(96)

Technology·Innovation

- High Flow Gas Drainage Technology of Goaf Under U-type Ventilation System for Large Mining Height Stope **XU Yusheng,LI Chunyuan,ZHANG Yong**(100)
- Rock Burst Prevention and Control Technology of Oblique Crossing Normal Fault in Fully Mechanized Coal Caving Face of Super Thick Coal Seam **JIAO Biao,FENG Longfei,HE Haihong,SHI Xingxing,TIAN Xiaobing,YANG Li**(105)
- Technology and Application of Directional Drilling with Mud Pulse Measurement with Drilling in High Level Directional Drilling of Roof **REN Haihui,LI Quanxin,FANG Jun**(110)
- Comprehensive Support Technology and Engineering Application of Pre-stressed Full-length Composite Anchorage and Anchorage-grouting Integration **SHAO Desheng,YANG Yonggang,LI Shihui,YANG Zhagjie**(114)
- Surrounding Rock Control Technology for Bed Plate Tunnel with High Gas Fracturing Soft Rock in Deep Well **HE Fulian,ZHAO Yongqiang,WU Jingke**(118)
- Prevention and Control of Rock Burst for Roadway Tunneling in High Stress Coal Pillar Area of Laohutai Mine **WANG Fujun,LI Xianzhi**(122)

Design·Development

- Application of Slant Drilling Rig in Coalbed Methane Horizontal Well **ZHAO Zhiyou,ZHANG Yongcheng**(124)
- A Kind of Water Cycling Use Technology for Directional Drilling in Coal Mine **XIAO Lihui,CHEN Yu,KONG Wei,PAN Xiaoye**(128)
- Study on Power System Matching of CBM Truck Mounted Drilling Rig **LU Feifei**(131)
- Realization of Wind Electricity Gas Closed-cycle by Safety Monitoring and Control System in Daping Coal Mine **LUO Zhengshi**(135)
- Design and Electromagnetic Simulation Analysis for Brushless DC Motor Mechanism of Mine-used Disconnecting Switch **ZHANG Hongkui,LI Dan,LI Yalin**(138)
- Bidirectional Waterproof Gate Chamber and Automatic Control System Design in Daizhuang Coal Mine **SUN Huanzhao,WANG Yao,GUO Yalan**(141)
- Mine-used Large Current and High Stable Digital Intrinsic Safe Power Supply Based on Single Chip Microcomputer Control **ZHANG Tianxing,XIA Chunhua,LIU Yiping,QIU Xuanbing,CAO Longshan**(144)
- Water-saving Filling System for Fly Ash in Pan'er Coal Mine **CHANG Zechao,WAN Zhijun,ZHENG Xiaodong,ZHANG Yuan**(148)



煤科集团沈阳研究院
有限公司

系列产品

- ◆ 紧急避险系统
- ◆ 煤矿安全生产监控系统及人员定位系统
- ◆ 煤矿瓦斯抽放配套装备
- ◆ 矿井通风防灭火装备
- ◆ 煤矿瓦斯基础参数测定仪器
- ◆ 矿山救护装备
- ◆ 低压供电系统配套装备
- ◆ 矿用钻机及配套装置
- ◆ 露天矿卡车调度系统及边坡监测装备
- ◆ 模拟仿真训练系列

立足服务

保障安全

依靠创新

共同发展

WWW.SYCCRI.COM

辽宁 抚顺 经济开发区滨河路11号
T 024-56616909 F 024-56616800

辽宁 沈阳 东滨河路108号
T 024-24117298 F 024-24117568



Quantitative Test Study on Tangential Load of Bolt Based on Fiber Bragg Grating Technology
LIU Zhongxi, LI Zhihong, HAO Bingyuan(152)
Implementation of Hydraulic Support Working Resistance Monitoring and Data Processing in Excel
WANG Aiwu, GUAN Yongxin, SUN Hao(157)
Fixed Cageway Spacing Measuring Instrument Based on LoRa
SHI Fazhao, YOU Xingyi, LI Yaxuan, LIU Shuting(160)
Cageway Spacing Measuring Instrument Based on Narrow Band Internet of Things
XU Yang, DUAN Shuangshuang, WANG Zhenbao, CUI Xuewei, XU Yuchuan(163)

Application Practice

Influencing Factors Analysis of Coal and Gas Outburst in Hegang Mining Area and Control Methods
TAN Yongfu(167)
Design of Mine Drainage System Under Condition of Rock Burst
SHENG Chao, ZHANG Ou, XU Dexin(171)
Deep Hole Grouting Reinforcement Technology in Working Face of Soft Coal Seam with Large Mining Height
ZHANG Jiangli, TAO Guangmei(175)
Application of Directional Drilling Technology for Detecting and Releasing Water of Protecting Roadway Excavation in Zhangji Coal Mine
DOU Xuqian, WEI Tingshuang, WANG Li, XU Baolong(179)
Design and Construction of Fire Dam with Soft Model in Yuyang Coal Mine
CHEN Tuoqi, DANG Xifeng(183)
Measures of Working Face Passing Through Broken Fault Based on New Grouting Strengthening Materials
ZHANG Xichuan, ZHOU Yujun, ZHANG Haibo(187)
Optimal Design of Lower Layer Mining and Anti-impact in Ultra-thick and Strong Bursting Coal Seam
QU Ying, QIAO Zhongdong, LI Shoufeng, SU Renyuan(190)

Analysis Discussion

Delineation of Gas Abnormal Area of Aishan Reverse Fault of Pingmei No.11 Mine
LEI Dongji, XUE Qunshan, ZHANG Yugui, MENG Hui(194)
Analysis of Influencing Factors of Gas Release in Isolated Working Face and Demonstration of Necessity of Pre-pumping
ZOU Yinhui, CHENG Jiansheng, ZHANG Feng, ZHAO Kai(198)
Model of Coal Reservoir Parameters Inversion Based on VBA
CAO Shiliu, LEI Guangyu(202)
Parameters Optimization for Hole Layout of Liquid CO₂ Phase-change Fracturing Technology Based on COMSOL Numerical Simulation
ZHANG Bailin, LI Haojun, ZHANG Xinghua(207)
Forecast of Gas Content Based on Gray Theory and Multiple Regression Analysis
XU Mangui, GAO Shuaishuai, CAO Yanjun, LU Yanan, WANG Jiaojiao(211)
Gas Content Determination Method Based on Effect Test of Regional Anti-outburst Measures
ZHANG Kaijia(215)
Research Progress of Dust Movement and Diffusion Laws in Excavation Roadway
DING Cui(219)
CFD Simulation Study on Treating Gas in Early Stage of Gas Production by Post-high Drainage Vertical Holes
LI Qiang, QIU Haisheng(223)
Diameter Expansion of Anchor Hole in Floor Roadway with Weak Interlayer During Drilling Process
DING Jun, LUO Yafei(228)
Shaft Blasting Vibration and CO₂ Fracturing Vibration Signals by Wavelet Packet Analysis
LIU Guanghui, WANG Hailiang, WU Qinxin(233)
Distribution of "Three Zones" in Goaf of the First Mining Face with Shallow Buried Depth
LYU Zhijin, OUYANG Hui(238)
Analysis on Causes of Spontaneous Combustion in Close Distance Coal Seam Group Under Condition of Gob Side Entry Mining Based on FTA
WU Hourong, HOU Bingchao, WAN Chaixiong, YIN Wei, YUAN Haoqin(242)
Karst Hydrogeological Characteristics and Prevention and Control Technology for Water Damage in Zhungar Coalfield
LI Hongjie, MA Jun, JIANG Peng, LI Ling, HAO Zhipeng(246)
Roof Water Inrush Risk Evaluation and Prevention in Xinjiang Dananhu No.7 Coal Mine
WU Xiaojun, FENG Guangjun, GAO Haitao, LIU Jing(252)
Influence of Folding Structure on Cracking Zone of Coal Roadway Surrounding Rock and Dynamic Pressure
ZHAN Yatai, WANG Jin'an, LI Fei, HAN Xiangang(257)
Roof Movement Law Analysis Based on Multi-support Joint Analysis Technique
XU Junjian, GUO Jiantao, ZHAO Guangxu, LU Xiangming, LI Shuai(262)
Failure Mechanism and Support Scheme of Large Section Roadway Surrounding Rock Under High Horizontal Stress
GUO Liang, HUANG Chenglin, ZHANG Chunlei(266)
Mechanism and Control Technology of Strong Strata Behavior of Gob-side Entry in Extra Thick Coal Seam with Hard Roof
DONG Hexiang, DUAN Hongfei, WANG Yajun(271)
Influence of Advancing Speed on Roof Overburden Activity
LIANG Dongmin, CHI Xiaolou(276)
Research on Triangulation Algorithm for Subsidence Prediction in Irregular Mining Work Face
ZHANG Bing, CUI Ximin, ZHAO Yuling, HE Junliang(280)
Numerical Simulation of Deep Normal Fault Working Face Design Based on Mining Stress Distribution
JIA Jiangfeng, SHU Jiaming, MA Ning, ZHANG Chen(284)
Development Characteristics and Control Measures of Xishan Dapugou Ground Collapse in Urumchi
CHEN Kai, WANG Wenke, WANG Huabing, ZHANG Zizhao, CHU Chunmei(289)

Supervision Management
Mechanism of Group Norms on Miners' Violation Behaviors
QI Hui, ZHANG Mingyang, CHEN Hong(293)
Risk Assessment of One-ventilation and Three-prevention System of a Mine in Guizhou Based on WBS-RBS
LI Chuang, YUAN Mei, CHEN Yin, WANG Yuli, XU Shiqing, ZHANG Ping(297)
Influence Factors of Thermodynamic Disasters Evacuation in Coal Mines
ZHU Yunfei, WANG Deming(301)
Cause Analysis of an Explosion Accident in Downhole Detonator Transportation Process
QIN Peijun(305)
Study on Influence of Illuminance Level on Miners Based on Physiological Signals
JING Guoxun, CHAI Yi, KAN Zhongyang(309)