

煤矿安全[®]

SAFETY IN COAL MINES



2
2019

第50卷 第2期

ISSN 1003-496X



煤科集团沈阳研究院有限公司 主管 煤科集团沈阳研究院有限公司 主办

目 次

实验·研究

高温高压下瓦斯在煤体内表面吸附力变化研究	侯 程,张英华,朱传杰(1)
含瓦斯煤渗透率影响因素敏感性试验研究	周建辛,王 肖(6)
不同变质程度煤自燃特性实验研究	刘宇帅(10)
煤矿硫化氢气体扩散规律及消除实验研究	高 宏,杨宏伟,韩 兵,钱志良(14)
气煤自燃特征参数规律研究	朱红青,赵鸿儒,李 珑,王晓宽,李世祥(19)
带压开采煤层底板破坏突水规律	张培森,安羽枫,武守鑫,赵亚鹏,魏 杰,王文苗(25)
深部高应力软岩巷道置孔释压材料孔数合理性研究	任 杰,李彦斌(30)
不同单一裂隙倾角对岩体破坏特征的影响	崔景昆,吴东涛,张 浩,洛 锋,王 凯,郭利军(34)
基于 GPR 频谱分析的隧道空溶洞解译特征研究	韦 猛,蒋 勇,袁晨瀚(38)
背斜对煤矿灾害的控制作用研究	金明方,李松营,王恩营(43)
基于应变测量的煤吸水膨胀变形特征实验研究	解北京,严 正,张诗蕾(48)
中煤阶煤声波速度对孔隙度的响应	冯绍盛,夏 鹏,曾凡桂(52)
深部煤层开采软 - 硬 - 软互层组合底板应力分布与破坏特征模拟研究	王文苗,张培森,魏 杰,安羽枫(57)
开采参数对远程上行卸压开采应力 - 裂隙的影响	肖家平,窦礼同,史长胜(61)

技术·创新

矿井瞬变电磁定点三维立体超前探测技术	邢修举(67)
底板梳状定向钻孔技术理论与实践	管强盛(72)
复杂地质条件下煤体 - 充填体协同控制技术	李 柱,谢 锋(76)
大跨度矩形巷道变形破坏机制及其控制技术	刘勇洪(81)
钢管混凝土墩柱沿空留巷技术与工艺	申玉三,武 凯,张 涛,黄万朋,王 军,董勤凯,夏志村(86)
煤岩注浆加固技术与高性能无机注浆材料研发	李西凡,熊祖强,刘旭峰,王雨利(91)

设计·开发

反循环取样钻头对不同硬度煤体的切削试验	张 睿(95)
巷道通风摩擦阻力系数数据库设计与实现	梁 军,王麒翔(99)
基于关键区域的井下人员轨迹挖掘方法	赵 端,顾优雅,张 雨,冯 凯(102)
王楼煤矿智能通风系统优化	王 斌,王永宝,郝继宝,孔 超,相 飞(105)
坑道岩心钻机调角机构设计与分析	王瑞泽(109)
浮充保护型磷酸铁锂电池在煤矿中的应用	齐明辉,王 政,严家明,张建文(113)
盾构机掘进煤矿巷道超前探测系统	赵栓峰,丁志兵,李凯凯,魏明乐,王文波(117)
轨道运载车鼓式制动器热力耦合分析	魏 娟,闫 豪,陆 盼,孙 健(121)
开式液压绞车重物起吊性能仿真分析	李彬彬(125)
采煤机液压制动器盘内温度在线检测系统	周新建,李 治(129)

缓闭阀门在斜井应急排水防水锤中的应用

葛亮,井婷婷(133)

四柱放顶煤液压支架结构特点及适应性能

马端志(137)

应用·实践

- 上保护层开采下伏煤岩卸压带瓦斯抽采优化设计 都锋(140)
石门揭煤区液态CO₂致裂增透加速消突技术 苏伟伟(144)
王坡煤矿本煤层预抽钻孔布置方式优化研究与效果考察 郝光生,马钱钱(148)
大垂距双层采空区流场平衡控制技术 杜春宁,宁德义,姜文忠(152)
上榆泉煤矿综放工作面采空区“三带”划分实践及防灭火技术 梁伟锋(156)
质量缺陷及粉化破裂立井井壁治理措施 姜希印,周玉华,刘体军,程继东,钱自卫(161)
高瓦斯工作面沿空留巷围岩控制机理及其工程应用 孟庆安(165)
井地联合压裂长钻孔技术实践 赵学良(169)
切顶卸压自成巷内支护及其稳定性控制 计庆辉,王昊昊(173)

分析·探讨

- 煤层气井不同排采阶段产水特征及排采管控方法研究与应用 余恩晓,马立涛,闫俊廷,周福双(179)
大采高工作面采动围岩活动与瓦斯涌出关系 何福胜,毕建乙,孙亮(183)
掘进工作面风排瓦斯系统可靠性分析 宣德全,秦琼(187)
基于渗流力学建立的煤层气井排水降压模型及排采规律分析
刘贺,罗勇,雷坤超,孔祥如,赵龙,田苗壮,沙特(190)
采空区埋地油气管道变形监测及稳定性分析 李正胜(195)
采动过程中底板隐伏陷落柱突水数值模拟 温兴林,王如猛,李兴东,王少强,杨志豪(199)
采空区底板不同深度岩体裂隙演化规律 郭良,张春雷(204)
基于能量密度相似性的多煤层冲击危险性评价方法 李兵,沈威,罗武贤,朱金标,朱彦飞,刘汉磊(208)
建筑物下固体充填开采地表沉陷规律分析 刘国旺,闫春杰(214)
爆破动荷载作用下深埋隧道失稳破坏模拟研究 张兰,孙中光(219)
正断层煤层开挖煤岩体的力学特性研究 周勇,程建圣,张占国,冀超辉(223)
膏体充填回收条带煤柱覆岩活化规律研究 宋光远,周华强(228)
不同组合方式煤岩组合体强度及声发射特征分析 周元超,刘传孝,马德鹏,赵振(232)
白砾滩露天矿二采区烧变岩边坡稳定性研究 吴杨,梁冰,夏冬,贾涓斐,郝硕(237)

监察·管理

- 高温联合噪声对矿工不安全行为的影响研究 田水承,张德桃(241)
安全文化对矿工生活的积极溢出研究 张涛,杨振宏,丁光灿,向梦珂(245)
基于改进FRAM模型的煤矿重大事故致因分析 乔万冠,李新春,刘全龙(249)
基于灰色关联分析的露天矿风险耦合机理模型研究 孟爱国(253)

CONTENTS

Test·Research

Study on Gas Adsorption Capacity on Coal Surface Under High Temperature and Pressure	HOU Cheng,ZHANG Yinghua,ZHU Chuanjie(1)
Sensitivity Test Study on Influencing Factors of Coal Containing Methane Permeability	ZHOU Jianxin,WANG Yi(6)
Experimental Study on Spontaneous Combustion Characteristics of Different Degrees of Metamorphic Coal	LIU Yushuai(10)
Experimental Study on Diffusion and Elimination of Hydrogen Sulfide Gas in Coal Mine	GAO Hong,YANG Hongwei,HAN Bing,QIAN Zhiliang(14)
Study on Characteristic Parameters Laws of Gas Coal Spontaneous Combustion	ZHU Hongqing,ZHAO Hongru,LI Ke,WANG Xiaokuan,LI Shixiang(19)
Water Inrush Laws of Floor Failure in Coal Seam with Pressure Mining	ZHANG Peisen,AN Yufeng,WU Shouxin,ZHAO Yapeng,WEI Jie,WANG Wenmiao(25)
Rationality of Hole Number of Pressure Relief Material in Deep High Stress Soft Rock Roadway	REN Jie,LI Yanbin(30)
Influence of Different Fissure Dip Angles on Damage Characteristics of Rock Mass	CUI Jingkun,WU Dongtao,ZHANG Hao,LUO Feng,WANG Kai,GUO Lijun(34)
Research on Interpretation Characteristics of Tunnel Empty Cave Based on GPR Spectrum Analysis	WEI Meng,JIANG Yong,YUAN Chenhan(38)
Effect of Anticline on Control of Coal Mine Disaster	JIN Mingfang,LI Songying,WANG Enying(43)
Experimental Study on Deformation Characteristics of Coal Water Absorption Expansion Based on Strain Measurement	XIE Beijing,YAN Zheng,ZHANG Shilei(48)
Response of Acoustic Wave Velocity to Porosity of Medium Rank Coal	FENG Shaosheng,XIA Peng,ZENG Fangui(52)
Simulation Study on Stress Distribution and Failure Characteristics of Soft-hard-soft Interbedded Composite Floor in Deep Seam Mining	WANG Wenmiao,ZHANG Peisen,WEI Jie,AN Yufeng(57)
Influence of Mining Parameters on Stress and Fissure in Long Distance Upward Pressure Relief Mining	XIAO Jiaping,DOU Litong,SHI Changsheng(61)

Technology·Innovation

Mine Transient Electromagnetic Fixed Point Three-dimensional Advance Detection Technology	XING Xiuju(67)
Theory and Practice of Floor Comb Type Directional Drilling Technology	GUAN Qiangsheng(72)
Co-control Technology of Coal Body and Filling Body Under Complex Geological Conditions	LI Zhu,XIE Feng(76)
Deformation and Failure Mechanism of Long-span Rectangular Roadway and Its Control Technology	LIU Yonghong(81)
Technology of Gob-side Entry Retaining Using Concrete-filled Steel Tubular Column	SHEN Yusen,WU Kai,ZHANG Tao,HUANG Wanpeng,WANG Jun,DONG Qinkai,XIA Zhicun(86)
Grouting Reinforcement Technology of Coal Rock and High Performance Inorganic Grouting Material Development	LI Xifan,XIONG Zuqiang,LIU Xufeng,WANG Yuli(91)

Design·Development

Cutting Test of Coal with Different Hardness by Reverse Circulation Sampling Bit	ZHANG Rui(95)
Design and Implementation of Friction Coefficient Database for Roadway Ventilation	LIANG Jun,WANG Qixiang(99)
Underground Personnel Trajectory Mining Method Based on Key Areas	ZHAO Duan,GU Youya,ZHANG Yu,FENG Kai(102)
Optimization of Intelligent Ventilation System in Wanglou Coal Mine	WANG Bin,WANG Yongbao,HAO Jibao,KONG Chao,JIANG Fei(105)
Design and Analysis of Angle Adjusting Mechanism for Tunnel Core Drill	WANG Ruize(109)
Application of Floating Charge Protective Iron Phosphate Lithium Battery in Coal Mine	QI Minghui,WANG Zheng,YAN Jiaming,ZHANG Jianwen(113)
Advanced Detection System for Shield Tunneling Coal Roadway	ZHAO Shuanfeng,DING Zhibing,LI Kaikai,WEI Mingle,WANG Wenbo(117)
Thermal Coupling Analysis of Drum Brake in Rail Carrier	WEI Juan,YAN Hao,LU Pan,SUN Jian(121)
Simulation Analysis of Lifting Performance of Open Hydraulic Winch	LI Binbin(125)

Temperature Online Detection System for Internal Temperature of Hydraulic Brake in Coal Mining Machine	ZHOU Xinjian,LI Zhi(129)
Application of Slow-closing Valves in Emergency Drainage Waterproof Hammer of Inclined Mine	GE Liang,JING Tingting(133)
Structural Characteristics and Adaptability of Four-leg Caving Top Coal Hydraulic Supports	MA Duanzhi(137)

Application·Practice

Optimization Design of Gas Extraction in Pressure Relief Zone of Coal and Rock Under Upper Protective Layer Mining	DU Feng(140)
Technology of Rapid Outburst Elimination by Liquid CO ₂ Fracturing in Region of Coal Uncovering	SU Weiwei(144)
Optimization Study and Effect Investigation of Pre-pumping Borehole Layout in Mining-coal Bed of Wangpo Coal Mine	HAO Guangsheng,MA Qianqian(148)

Control Technology of Flow Field Balance in Double-layer Goaf with Large Vertical Distance	DU Chunning,NING Deyi,JIANG Wenzhong(152)
--	---

Practice and Fire Prevention and Extinguishing Technology of “Three Zones” Division in Goaf of Fully Mechanized Caving Face of Shangyuquan Coal Mine	LIANG Weifeng(156)
--	--------------------

Treatment Measures of Quality Defects and Fractured Shaft Wellbore	JIANG Xiyin,ZHOU Yuhua,LIU Tijun,CHENG Jidong,QIAN Ziwei(161)
--	---

Control Mechanism of Surrounding Rock of Gob-side Entry in a Highly Gassy Working Face and Its Application	MENG Qing'an(165)
Practice of Integrated Well and Ground Fracturing Long Drilling Technology	ZHAO Xueliang(169)

Internal Support and Stability Control of Self-forming Roadway with Roof Cutting and Pressure Relief	JI Qinghui,WANG Haohao(173)
--	-----------------------------

Analysis·Discussion

Study and Application of Water Production Characteristics and Drainage and Mining Control Methods in Different Drainage and Mining Stages of CBM Wells	YU Enxiao,MA Litao,YAN Junting,ZHOU Fushuang(179)
--	---

Relationship Between Surrounding Rock Movement and Gas Emission in Large Mining Height Working Face	HE Fusheng,BI Jianyi,SUN Liang(183)
---	-------------------------------------

Reliability Analysis of Air Exhaust Gas System in Heading Face	XUAN Dequan,QIN Qiong(187)
--	----------------------------

Analysis of Drainage and Depressurization Model and Drainage Laws of CBM Well Based on Seepage Mechanics	LIU He,LUO Yong,LEI Kunchao,KONG Xiangru,ZHAO Long,TIAN Miaozihuang,SHA Te(190)
--	---

Stability Analysis and Deformation Monitoring of Buried Pipelines in Underground Mined Out Zone	LI Zhengsheng(195)
---	--------------------

Numerical Simulation of Water Inrush from Concealed Floor Collapse Column During Mining	WEN Xinglin,WANG Rumeng,LI Xingdong,WANG Shaoqiang,YANG Zhihao(199)
---	---

Fracture Evolution Law of Rock Mass at Different Depths of Floor in Gob	GUO Liang,ZHANG Chunlei(204)
---	------------------------------

Rock Burst Risk Assessment of Multiple Coal Seams Based on Energy Density Similarity	LI Bing,SHEN Wei,LUO Wuxian,ZHU Jinbiao,ZHU Yanfei,LIU Hanlei(208)
--	--

Analysis of Surface Subsidence Laws of Solid Filling Mining Under Buildings	LIU Guowang,YAN Chunjie(214)
---	------------------------------

Simulation Study on Unstable Failure of Deep Tunnel Under Blasting Load	ZHANG Lan,SUN Zhongguang(219)
---	-------------------------------

Research on Mechanical Characteristics of Coal and Rock Mass in Coal Seam Excavation of Normal Fault	ZHOU Yong,CHENG Jiansheng,ZHANG Zhanguo,JI Chaohui(223)
--	---

Study on Activation Laws of Overlying Strata During Strip Coal Pillar Recovery by Paste Backfill	SONG Guangyuan,ZHOU Huaqiang(228)
--	-----------------------------------

Analysis of Strength and Acoustic Emission Characteristics of Coal and Rock Mass in Different Combinations	ZHOU Yuanchao,LIU Chuanxiao,MA Depeng,ZHAO Zhen(232)
--	--

Slope Stability Study on Burnt Rock of No.2 Mining Area in Bailitan Open Pit Coal Mine	WU Yang,LIANG Bing,XIA Dong,JIA Yufei,HAO Shuo(237)
--	---

Supervision·Management

Effect of High Temperature Combined Noise on Miner’s Unsafe Behavior	TIAN Shuicheng,ZHANG Detao(241)
--	---------------------------------

Study on Positive Spillover of Safety Culture to Miners’ Life	ZHANG Tao,YANG Zhenhong,DING Guangcan,XIANG Mengke(245)
---	---

Analysis of Major Accidents in Coal Mines Based on Improved FRAM Model	QIAO Wanguan,LI Xinchun,LIU Quanlong(249)
--	---

Study on Model of Risk Coupling Mechanism of Open-pit Mine Based on Grey Relational Analysis	MENG Aiguo(253)
--	-----------------



煤 传 媒



煤 矿 安 全

中文核心期刊

中国科技核心期刊

RCCSE 中国核心学术期刊

美国《化学文摘》收录期刊

美国《乌利希期刊指南》收录期刊

俄罗斯《文摘杂志》收录期刊

煤矿安全[®]

MEIKUANG ANQUAN

月刊 (1970 年创刊)

第 50 卷 第 2 期 总第 536 期 2019 年 2 月

SAFETY IN COAL MINES

Monthly (Started in 1970)

Vol.50 No.2 (Series No.536) February 2019

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 梁运涛
副 主 编 梁绍权
执行主编 王福厚
编辑部主任 王福厚
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
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 煤炭科学研究院抚顺分院胶版印刷厂
统 一 社 会 信 用 代 码 91210400463312350A
商 标 注 册 证 第 1144537 号
网 址 www.mkaqzz.com
出 版 期 日 2 月 20 日

Supervisor CCTEG Shenyang Research Institute
Sponsor CCTEG Shenyang Research Institute
Editor-in-Chief LIANG Yuntao
Associate Editor-in-Chief LIANG Shaoquan
Executive Editor-in-Chief WANG Fuhou
Editorial Director WANG Fuhou
Distribution Director LIU Mingzhi
Publisher Editorial Office of《SAFETY in COAL MINES》
Address No.11 of Binhe Road, Fushun Economic Development Area, Liaoning, China
Post Code 113122
Distribution Range Public Offering
Subscription Editorial Office of《SAFETY in COAL MINES》or Local Post Offices
Subscription Code 8-293
Printed by Offset Printing Factory of Fushun Branch of CCRI
Uniform Social Credit Code 91210400463312350A
Trademark Registration Certificate No.1144537
Website www.mkaqzz.com
Publication Date February 20

中国标准连续出版物号：ISSN 1003-496X
CN 21-1232/TD
国内定价：20.00 元

电 话：(024) 56616988 56616987 56616981
电子邮箱：mkaq@163.com 北京联络处：(010) 64464228