

江西省优秀科技期刊

万方数据——数字化期刊群全文入网期刊

中国期刊全文数据库收录期刊

中国煤炭数字图书馆全文收录核心期刊

中国学术期刊(光盘版)全文收录期刊

中国煤炭技术与设备网入网期刊

中国核心期刊(遴选)数据库收录期刊

煤炭科技论文数据库收录期刊

中国学术期刊综合评价数据库统计源期刊

中文科技期刊数据库收录期刊

ISSN 1006-2572

CN 36-1121/TD

江西煤炭科技

总第一百七十二期

二〇二一年十一月  
第四期

# 江西煤炭科技

JIANGXI COAL SCIENCE & TECHNOLOGY

4

2021

第4期 2021年11月出版

江西省煤炭学会  
江西省能源集团有限公司  
江西省煤炭经济研究会  
江西省煤炭工业科学研究所

主办

ISSN 1006-2572



9 771006 257217

JIANGXI MEITAN KEJI

(季刊)

-----1979 年创刊-----

2021 年第 4 期(总第 172 期)

2021 年 11 月出版

主管单位 江西煤矿安全监察局

主办单位 江西省煤炭学会

江西省能源集团有限公司

江西省煤炭经济研究会

江西省煤炭工业科学研究所

编辑出版 《江西煤炭科技》编辑部

通讯地址 江西省南昌市北京东路 23 号  
(330029)

主 编 吴银富

责任编辑 岑代全 彭呈喜

电 话 0791-88326754

电子信箱 jxmtkj@163. com

发行范围 公开发行

订 购 处 《江西煤炭科技》编辑部

国内标准连续出版物号 CN 36-1121/TD

国际标准连续出版物号 ISSN 1006-2572

广告经营许可证号 3600004000039

印 刷 江西晨光彩印包装有限责任公司

定 价 25.00 元

#### 本刊关于作者稿件版权转让的声明

本刊已被中国核心期刊(遴选)数据库、中国期刊全文数据库、中国学术期刊综合评价数据库、中文科技期刊数据库、煤炭科技论文数据库等收录。

本刊对发表的文章同时持有与网络数据库合作以数字化方式复制、编绘、发行、信息网络传播的权利,文章著作权使用报酬及稿酬一次付清。稿件一经采用,作者向本刊提交文章发表的行为即视为同意本刊上述声明。

作者如不同意上述约定,请在来稿中声明,编辑部将做适当处理。

## 目 次

### ●采矿技术

- 大采高工作面矿压规律分析 ..... 焦炎斌(1)  
坚硬顶板大倾角软煤综采安全技术探析 ..... 时昌鹏(4)  
临时支护在曲江煤矿掘巷中的改进与完善 ..... 万林水(7)  
厚软弱顶板岩层巷道围岩控制技术研究与应用 ..... 刘小军(10)  
11-104回风顺槽分区域差异性联合支护技术应用 ... 李建平(12)  
厚泥质顶板岩层大采高切眼巷道加强支护技术 ..... 郑田野(15)  
浅壁煤层注水防片帮技术实践 ..... 薛霄飞(17)  
金能煤业2号煤松动圈测试及应用 ..... 任泽明(19)  
下霍煤矿1306回风顺槽掘锚护一体化技术应用 ..... 暴广昌(22)  
掘进巷道过断层复合支护技术应用 ..... 刘亮(25)  
近距离煤层采空区下巷道支护技术研究 ..... 张弘弦(27)  
榆树坡矿5105综放工作面矿压显现规律探索 ..... 程德中(30)  
辛置煤矿2-560工作面动压巷道围岩控制技术 ..... 高振华(33)  
潞宁煤业22116工作面切顶卸压护巷技术应用 ..... 王亮(36)  
基于锚杆锚索支护条件下围岩稳定性分析 ..... 王二喜(39)  
交错式超前支护装置在综掘巷道中的应用

..... 韩光华,徐旷(42)

- 木瓜煤矿回采巷道复合顶板协同支护技术应用 ..... 李南(44)  
综采工作面切顶卸压自成巷技术应用探索 ..... 张卫鹏(46)  
18104综采面切眼扩安一体化工艺实践 ..... 宋益城(49)  
大采高综采工作面过陷落柱技术探讨 ..... 赵杰(52)  
动压影响下巷道围岩破坏变形特征分析及控制

..... 李海波,郭海东(55)

- 增子坊矿303综放面爆破过陷落柱技术实践 ..... 吴琼(58)  
大采高综采面沿空巷道围岩控制技术探讨 ..... 高敏(60)  
9402运输顺槽底鼓防治技术试验研究 ..... 侯艳峰(63)  
王坡煤业大断面巷道支护方式优化 ..... 刘伟伟(66)  
复杂条件下综放工作面仰采工艺技术探索 ..... 樊殿鑫(70)  
基于ADAMS软件的液压支架顶梁负载特性分析 ..... 高志伟(74)  
采动条件下巷道支护方案优化与效果 ..... 王育丰(76)  
快速掘进巷道空顶与围岩稳定数值模拟分析 ..... 雷卫锋(79)  
松软煤层沿空掘巷“精准治断层”技术实践 ..... 李文枫(83)  
庞庞塔矿综放面覆岩破坏特征与矿压显现规律 ..... 杨云刚(87)  
数值模拟在巷道支护优化设计中的应用 ..... 荆琪,贾超(90)  
连采双巷快速掘进工艺优化 ..... 杨健,李小辉(93)  
亿欣煤业综采面爆破切顶留巷技术应用分析 ..... 安浩炜(96)  
福城煤矿副井井筒延伸施工技术研究 ..... 李明明(99)  
近距离煤层采空区下综放面回采巷道支护研究 ... 裴春敏(102)  
黑龙煤业综放工作面煤柱留设宽度探讨 ..... 苏燚豪(104)

### ●地测防治水技术

- 乐平矿区煤层气赋存规律及资源潜力分析 ... 祝强,肖富强(107)

Jiangxi Coal Science &  
Technology  
JIANGXI MEITAN KEJI  
(Quarterly)

-----Started in 1979-----

No. 4 2021 ( Series No. 172 )

November 2021

Responsible Institution

Jiangxi Bureau of Colliery Safety Supervision

Sponsor

Jiangxi Coal Society

Jiangxi Energy Group Limited company

Jiangxi Research Institute of Coal Industry

Jiangxi Research Institute of Coal Industry

Editorial and Publishing Dept.

Editorial Office of Jiangxi Coal Science&Technology

Address

No.23, Beijing east road, nanchang, jiangxi (330029)

Chief Editor Wu Yinfu

Responsible Editor

Cen Daiquan Peng Chengxi

Tel/Fax (0791)88326754

E-mail jxmtkj@163.com

Issue Scope Public Offering

Order Office

Order Office Editorial Office of Jiangxi Coal Science&Technology

Periodical Registration No.

CN 36-1121/TD  
ISSN 1006-2572

License No. of Advertising

3600004000039

Printed by

Jiangxi morning light color printing & preking llc

List Price 25.00

- 赣西北地区新开岭组泥页岩层地球化学特征 ..... 黄璜(111)  
工作面上覆采空区积水防治技术分析与应用 ..... 李文东(114)  
10-201工作面充水因素分析与防治水措施 ..... 袁远(117)  
木瓜煤矿工作面顶板含水层突水危险性评价 ..... 胡雪墩(120)  
云岗矿8号煤层底板奥灰水突水危险性评价 ..... 周丽娜(125)  
庞庞塔矿奥灰水带压开采安全性分析评价 ..... 杨刚(128)  
掘进巷道前方陷落柱的综合探查 ..... 朱志刚(131)  
对GB/T 17766-2020《固体矿产资源储量分类》的几点思考  
..... 郑伟元,吴昊(134)  
五阳煤矿构造发育特征及其对开采的影响 ..... 常蓝天(136)  
中空注浆锚索在破碎围岩中的应用 ..... 高雄(139)

●通风安全技术

- 低透厚煤层穿层水力割缝增透技术试验研究  
..... 左杨,阮杰(141)  
丰城矿区B<sub>4</sub>煤层瓦斯赋存及分布规律研究 ..... 邹爱国(144)  
综采面采空区大孔径瓦斯抽采技术应用 ..... 姚美红(147)  
四老沟矿通风阻力测定与分析 ..... 王昭(150)  
改性岩粉对煤尘爆炸惰化效果实验研究 ..... 常小军(153)  
长距离巷道贯通通风系统精准调整技术探讨 ..... 李波(157)  
辛置煤矿掘进面粉尘防治技术应用实践 ..... 刘丁豪(160)  
定向长钻孔条带预抽技术在松软突出煤层应用 ..... 李臣武(162)  
近距离多煤层开采取消均压系统可行性研究 ..... 许金波(166)  
昆明地铁5号线有害气体勘察与治理措施研究\*  
..... 杨超,蒋飞军,张良平,等(170)  
掘进工作面受限空间风险管控对策探索 ..... 李智刚(175)

●机电信息化技术

- 基于模糊控制的移动机器人路径规划仿真研究 ..... 王茜(178)  
空压机自动控制及手机物联应用的改造 ..... 秦帅(181)  
选煤厂智能除尘系统设计与应用 ..... 潘瑛(183)  
无轨自移式设备列车在开元矿综采面的应用 ..... 王军平(186)  
选煤厂的智能快速定量装车系统设计 ..... 李晓强(188)  
赵家寨煤矿综放工作面智能化改造研究  
..... 程宝军,张天山,陈跃朋(190)

- 基于变频调速的皮带智能控制系统设计 ..... 张德明(193)  
提高煤泥分选精度的工艺研究 ..... 孔德涛(196)  
开关磁阻式智能电机在选煤厂的应用 ..... 戚国亮(198)

●环保清洁能源技术

- 不同方向取样的页岩孔隙差异实验结果分析 ..... 张铮(201)  
二连浩特—扎门乌德中蒙经济合作区(中方)供热设计  
..... 许高升(203)

●经营管理及其他

- 煤矿走“四安”之路的探索与实践 ..... 金江涛,汤国辉(205)  
基于PDCA法的矿井安全管理体系分析 ..... 张娟(208)  
煤矿科技创新助推矿井高质量发展探索 ..... 王飞,陈博(211)  
自然资源的确权登记与资产离任审计关联探讨 ..... 徐强(213)

# Contents

## Mining Technology

Analysis of Strata Behavior Law at Large-mining-height Working Face .....	Jiao Yanbin(1)
Discussion on Fully-mechanized Mining Safety Technology for Hard-roof Deeply-inclined Soft Coal Seam .....	Shi Changpeng(4)
Improvement and Perfection of Temporary Support in Tunneling in Qujiang Colliery .....	Wan Linshui(7)
Research and Application of Surrounding Rock Control Technology at Roadway under Thick and Weak Roof Strata .....	Liu Xiaojun(10)
Application of Regional Differential Combined Support Technology for Air-return Crossheading .....	Li Jianping(12)
Support Reinforcement Technology in Large-mining-height Open-off Cut Roadway with Thick-shale Roof Strata .....	Zheng Tianye(15)
Practice on Rib Spalling Prevention Technology by Water Injection in Coal Seam .....	Xue Xiaofei(17)
Testing and Control Application of Loose Circle of No. 2 Coal in Jinneng Coal Industry Co., Ltd. ....	Ren Zeming(19)
Application of Integrated Technology of Driving, Bolting and Supporting at 1306 Air-return Crossheading of Xiahuo Colliery .....	Bao Guangchang(22)
Application of Compound Support Technology in Crossing Fault in Roadway Excavation .....	Liu Liang(25)
Study on Roadway Supporting Technology under Goaf in Close-distance Coal Seam .....	Zhang Hongxian(27)
Exploration on the Pressure Behavior Law at 5105 Fully-mechanized Caving Face in Yushupo Colliery .....	Cheng Dezhong(30)
Discussion on Surrounding Rock Control Technology in Dynamic Pressure Roadway at 2-559 Working Face of Xinzhi Colliery .....	Gao Zhenhua(33)
Application of Roadway Protection Technology with Pressure Relief by Roof -Cutting at 22116 Working Face of Luning Coal Industry Co., Ltd. ....	Wang Liang(36)
Analysis of Surrounding Rock Stability Based on Bolt-and-Cable Support .....	Wang Erxi(39)
Application of Staggered Advanced Supporting Device in Fully-mechanized Roadway .....	Han Guanghua ,Xu Kuang(42)
Application of Coordinating Support Technology in Compound Roof at Gateway .....	Li Nan(44)
Application of Self-formed Roadway by Roof Cutting and Pressure Relief at Fully Mechanized Mining Face .....	Zhang Weipeng(46)
Practice on Integration of Slope Expansion and Installation Technology in Open-off Cut at 18104 Fully-mechanized Working Face .....	Song Yicheng(49)
Discussion on Crossing Subsided Column at Large-mining-height Fully-mechanized Working Face .....	Zhao Jie(52)
Analysis and Control of Failure Deformation Characteristics in Roadway Surrounding Rock under Dynamic Pressure .....	Li Haibo,Guo Haidong(55)
Technical Practice of Blasting through Subsided Column in 303 Fully-Mechanized Caving Face of Zengzifang Colliery .....	Wu Qiong(58)
Discussion on Disaster Control Technology of Roadway Surrounding Rock in Gob-side entry at Large-mining-height Fully-mechanized Working Face .....	Gao Min(60)
Experimental Research on Control Technique of Floor Heave of 9402 Conveyor Gateway .....	Hou Yanfeng(63)
Optimization of Supporting Mode of Large Section Roadway in Wangpo Coal Industry .....	Liu Weiwei(66)
Probe into Dip and Rising Technology in Fully Mechanized Caving Face under Complicated Conditions .....	Fan Dianxin(70)
Analysis of Load Characteristics of Hydraulic Support Top Beam Based on ADAMS .....	Gao Zhiwei(74)
Optimization and Effect of Roadway Support Scheme under Mining .....	Wang Yufeng(76)
Numerical Simulation Analysis of Empty Roof and Surrounding Rock Stability in Rapid Excavation Roadway .....	Lei Weifeng(79)
Technical Practice of "Precision Treatment of Fault" of Gob-side Entry in Soft Coal Seam .....	Li Wenfeng(83)
Study on Characteristics of Overburden Failure and Strata Behavior Law in Fully Mechanized Caving Face of Pangpangta Colliery .....	Yang Yungang(87)
Application of Numerical Simulation in Optimization Design of Roadway Supporting .....	Jing Qi,Jia Chao(90)
Optimization of Continuous Mining Two Gateways Rapid Excavation Technique Based on New Detailed Rules of Outburst Prevention .....	Yang Jian,Li Xiaohui(93)
Application Analysis of Blasting Roof Cutting and Roadway Retaining Technology in Fully Mechanized Face of Yixin Coal Industry Co. ....	An Haimei(96)
Research on Construction Technology of Auxiliary Shaft Bating in Fucheng Colliery .....	Li Mingming(99)
Research on Gateway Support at Fully-mechanized Caving Face under Goaf in Close-distance Coal Seam .....	Pei Chunmin(102)
Discussion on Coal Pillar Width Setting at Fully-mechanized Caving Face in Heilong Coal Industry Co., Ltd. ....	Su Yihao(104)

## **Water Control Technology in Geological Survey**

Analysis on Occurrence Law and Resource Potential of Coalbed Methane in Leping Mining Area .....	Zhu Qiang,Xiao Fuqiang(107)
Geochemical Characteristics of Shale Formation in Xinkailing Formation in Northwestern Jiangxi .....	Huang Huang(111)
Analysis and Application of Seep Control Technology in Overlying Goaf at Working Face .....	Li Wendong(114)
Analysis of Water filling Factor and Water Control Measures at 10–201 Working Face .....	Yuan Yuan(117)
Hazard Analysis of Water Inrush in Roof Aquifer at Working Face of Mugua Colliery .....	Hu Xuedun(120)
Water Inrush Risk Assessment of Ordovician Water from No. 8 Coal Seam Floor of Yungang Colliery .....	Zhou Lina(125)
Safety Analysis and Evaluation of Mining under Pressure with Ordovician limestone Water in Pangpangta Colliery .....	Yang Gang(128)
Comprehensive Detection of Subsided Column ahead Excavation Roadway .....	Zhu Zhigang(131)
Reflection on National Standard GB/T 17766–2020 “Classification of Solid Mineral Resources Reserves” .....	Zheng Weiyuan,Wu Hao(134)
Structure Development Characteristics of Wuyang Colliery and Its Influence on Mining .....	Chang Lantian(136)
Application of hollow grouting anchor cable in broken surrounding rock .....	Gao Xiong(139)

## **Ventilation Safety Technology**

Experimental Research on Antireflection Technology of Penetration Hydraulic Cutting Seam in Low Permeability Thick Coal Seam .....	Zuo Yang,Ruan Jie(141)
Research on Gas Occurrence and Distribution Law of B Coal Seam in Fengcheng Mining Area .....	Zou Aiguo(144)
Application of Large Aperture Gas Drainage Technology in Goaf of Fully Mechanized Coal Face .....	Yao Meihong(147)
Analysis and Determination of Ventilation Resistance in Silaogou Colliery .....	Wang Zhao(150)
Experimental Research on the Effect of Modified Stone Dust on Coal Dust Explosion Inerting .....	Chang Xiaojun(153)
Discussion on Accurate Adjustment Technology of Ventilation System of Long-distance Roadway Threaded Together .....	Li Bo(157)
Application of Dust Control Technology in Heading Face of Xinzhi Colliery .....	Liu Dinghao(160)
Application of Strip Pre-drainage Technology with Directional Long Borehole in Soft and Outburst Coal Seam .....	Li Chenwu(162)
Feasibility Study on Banning Pressure Equalizing System in Short-distance Multi-seam Mining .....	Xu Jinbo(166)
Research on Harmful Gas Survey and Treatment Measures of Kunming Metro Line 5* .....	Yang Chao,Jiang Feijun,Zhang Liangping ,et al(170)
Probe into Risk Management and Control Countermeasures of Restricted Space in Mining Face .....	Li Zhigang(175)

## **Electromechanical Informatization Technology**

Research and Simulation of Path Planning for Mobile Robot Based on Fuzzy Control .....	Wang Xi(178)
Transformation of Automatic Control of Air Compressor and Application of Mobile Phone IOT .....	Qin shuai(181)
Design and Application of Intelligent Dust Removal System in Coal Preparation Plant .....	Pan Ying(183)
Application of Trackless Self-moving Equipment Vehicle in Kaiyuan Colliery .....	Wang Junping(186)
Design of Intelligent Fast Quantitative Loading System Used in Coal Preparation Plant .....	Li Xiaoqiang(188)
Study on Intelligent Transformation of Fully Mechanized Caving Face in Zhaojiazhai Colliery .....	Cheng Baojun,Zhang Tianshan,Chen Yuepeng(190)
Design of Belt Intelligent Control System Based on Variable-frequency Speed Regulation .....	Zhang Deming(193)
Study on Technology of Improving Precision of Coal Slime Separation .....	Kong Detao(196)
Application of Switched Reluctance Intelligent Motor in Coal Preparation .....	Qi Guoliang(198)

## **Environmental Clean Energy Technology**

Analysis of Experimental Results of Pore Difference of Shale Samples from Different Directions .....	Zhang zheng(201)
Heating Supply Design for Erenho–Zamin Uud China–Mongolia Economic Cooperation Zone (China) .....	Xu Gaosheng(203)

## **Operating Management ,etc.**

Exploration and Practice on Taking Road of “Four Safeties” in Mines .....	Jin Jiangtao,Tang Guohui(205)
Analysis and Discussion of Mine Safety Management System Based on PDCA Method .....	Zhang Juan(208)
Exploration of Coal Mine Science and Technology Innovation Boosting High-quality Development of Mines .....	Wang Fei,Chen Bo(211)
Discussion on Correlation between Right Confirmation Registration of Natural Resources And off-office Asset Auditing .....	Qiang Xu(213)

中国标准连续出版物号:  
ISSN 1006-2572  
CN 36-1121/TD  
定价: 25.00元