

煤矿安全

SAFETY IN COAL MINES

ISSN 1003-496X
CN 21-1232/TD

9
2016

Vol. 47 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

煤矿用激光甲烷传感器

煤矿用激光甲烷传感器采用激光吸收光谱技术，是具备测量精确、标校周期长、不受水汽和其它交叉气体干扰的高性能环境甲烷监测仪表，用于煤矿井下或其它需要监测环境甲烷浓度的场所。



性能特征

- 采用高分辨率激光吸收光谱技术，消除气体交叉干扰，降低甲烷监测误报。
- 具备温度自适应和补偿功能，测量结果不受环境温度影响。
- 具备压力补偿功能，测量结果不受环境压力变化的影响。
- 支持频率、RS485和CAN三种信号传输方式。



ISSN 1003-496X



WWW.GLTECH.CN

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

ADD: 郑州高新技术产业开发区长椿路十号

月刊(1970年创刊)

2016年9月

第47卷第9期(总第505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

目 次

试验·研究

CO₂气体对瓦斯爆炸的阻尼效应研究 陆卫东,贾宝山,李守国,尹彬(1)

负压抽采条件下孔隙率对动态加载构造煤渗透率影响的实验研究 杨小鹏(4)

蠕变条件下顺层钻孔抽采负压分布研究 白亚鹏,左伟芹,刘明举(8)

煤岩裂隙瓦斯运移规律的实验研究 宋守一,张英华,杨飞,黄志安,高玉坤,王辉(12)

煤锤击破坏瞬变电磁信号特征实验研究 解北京,吕平洋,马红星,王川(16)

顺风流扰动下喷雾场粒度-速度分布规律实验 邱晗,朱良,范韬(20)

粒径对含瓦斯型煤力学性质及渗透特性影响的试验研究

袁梅,许江,李波波,王珍,杜育芹,许石青(24)

风流中低浓度甲烷微生物降解效能实验 崔学锋,张瑞林(28)

浅埋近距煤层覆岩导水裂隙发育规律固液耦合试验研究

金志远,赵小英,马立强,许猛堂(32)

单一煤层综放工作面采空区遗煤瓦斯涌出规律研究 王志亮,陈学习(35)

基于流固耦合理论的砂土渗透破坏模拟研究 倪宏阳,浦海,李昀(39)

冻结井壁安全监测评价方法探究 王磊,王建平,洪伯潜(42)

薄煤层厚灰岩下混凝土巷旁充填沿空留巷研究 张九雨(46)

粉煤灰混凝土力学性能试验研究 姚文杰,庞建勇,姚韦靖(50)

切顶卸压沿空留巷切缝设计与研究 汤建泉,宋文军,宋立兵,郭志懿(53)

大采高直接顶关键层结构转化特征研究 蔡志炯(56)

平缓地貌间隔式煤柱下底板应力分布规律研究 张付涛,魏陆海,郭志伟(60)

技术·创新

大倾角工作面支架稳定性控制技术 李小萌,程占博,赵青波(64)

高瓦斯倾斜煤层综放工作面抽采瓦斯技术 刘殿福,赵鹏翔,张雪涛,安学东,杨俊生,孙红星,姚晚波(67)

突出煤层穿层钻孔钻扩一体化增透技术 王志坚,贾宏伟(71)

气体流场动态平衡多点调控技术 周勇(75)

胶体防灭火技术在深井综放工作面的应用 冯良兵,徐超,高星星,刘大虎(79)

罐装液态二氧化碳直接防灭火技术 张长山,张辛亥(82)

复杂条件下上覆采空区积水综合防治技术 陈涛,李玉兵(85)

基于倾斜切槽回填技术的深井巷道剪切错动型底鼓防治 付孟雄,于涛(89)

深部回采巷道围岩破坏机制及控制技术 张红军,李海燕,李红伟(93)

综放工作面预筑充填墙无煤柱开采原理与技术 芦志刚(97)

设计·开发

成庄矿瓦斯超限及突出预警系统 杨宏伟,李海贵,徐光亮(101)

煤矿安全监控系统双机软件切换功能实现 张伟杰(104)

35 kV煤矿电网高压断路器三相电机操动机构控制技术 张红奎(106)

基于地面三维激光扫描技术的输煤栈桥支架倾斜监测 蒋小虎,姚顽强,张咏,马柏林,薛贝,张昆巍(110)

矿用锚杆长度无损测量电路的设计 王辉,刘秋平(114)

煤矿斜井跑车防护装置监控系统 蒋孙仑,姚善化,任明远(117)

煤矿巷道顶板锚索托盘受力特征及适用性分析 张辉,程利兴,刘少伟,于涛(120)

应用·实践

采空区自燃诱发瓦斯灾害耦合致灾特性及防控技术 刘振岭(124)

泡沫除尘技术在山脚树矿综采工作面的应用 胡东亮,徐贤华,王吉斌(128)

新型煤尘捕获固尘技术在矿井除尘中的应用 陶龙龙, 刘 畅, 谢霄云, 严 俊(131)

易自燃煤层高瓦斯工作面火区治理实践 赵亚明, 宋双林, 师吉林(134)

分段压裂技术在贵州松河煤层气开发中的应用 胡海洋, 金 军, 田树烜(137)

近距离煤层群同采防灭火技术 任显财(141)

唐口煤矿 2307 工作面煤层高压注水工艺实践 黄书祥, 王海宾, 邱 晗(144)

万利一矿矿井水复用“零排放”工程实践 孙颜顶, 陈冬冬, 杜晓武, 朱 涛, 冯泽康, 王志坤(148)

付家焉煤矿矿井通风系统优化实践 范加锋, 富 向, 高永强, 斯艳龙(151)

双液速凝注浆材料在破碎围岩加固中的应用 张耀辉(155)

露天转地下 L 型工作面开采上覆岩体稳定性分析及边坡治理方案 孙世国, 张玉娟, 张英海, 缪爱伟(158)

分析·探讨

基于 AVO 反演技术的赵家寨煤矿煤层瓦斯含量分布预测 石记红(162)

顺层钻孔合理封孔深度研究 王喜亭, 宣德全, 曹拓拓(166)

低渗煤样 CH₄ 非线性压力分布与渗透率演化 陈超凡, 王 睿, 薛东杰, 卓 壮, 周宏伟(169)

背斜坚硬顶板采空区瓦斯燃烧原因分析及处理措施 周应江, 于智卓, 郭 辉(173)

煤体瓦斯解吸模型验证分析 蔡 进, 马中飞, 李立夫(176)

低透气性煤层水力冲孔增透合理冲孔煤量的确定 袁德铸, 李学臣(180)

基于层次分析法的井壁厚度优选 王 磊, 李祖勇(183)

断层倾角对逆断层活化规律影响的模拟分析 苗 旺, 张培森, 王 浩, 李 凯, 赵仕钧, 阚忠辉(187)

斯列萨列夫公式在矿井水害防治中的应用分析 杨志斌(190)

基于改进模糊层次分析法的煤层底板突水危险性评价 潘国营, 秦永泰, 马亚芬(194)

底板隐伏断层采动活化突水的断裂力学分析 杨登峰, 柴 茂, 江博文, 李 博, 柴佳乐, 赵限维(198)

采动效应下煤层底板变形破坏数值模拟 马功社, 孙四清, 郑凯歌, 李 川, 龙威成, 陈冬冬(202)

基于应力 - 渗流耦合效应的含断层煤层底板破坏特征分析 吴建琼(206)

基于 FLAC^{3D} 的巷道围岩高强预紧力支护数值模拟 卓先德, 崔 伟(210)

柠条塔煤矿叠置开采地表岩移参数分析 赵兵朝, 刘 宾, 王建文, 凡奋元, 刘 浪, 侯恩科(213)

深部近距离保护层开采煤柱矿压显现规律 杨荣宽, 宋锦虎, 刘 帅, 张功会, 陈坤福(217)

锚杆预紧力对深井煤巷围岩稳定性的影响 宋宗武(221)

西部极松软围岩条件下大断面巷道合理间距研究 周 勇, 王金安(225)

厚顶煤高煤帮巷道围岩稳定及控制分析 徐祝贺, 杨玉亮, 李永明(229)

国外煤矿应急救援技术装备综述 黄军利(233)

监察·管理

基于 PII 分析法的煤矿瓦斯事故分析研究 张景钢, 安美秀(237)

煤与瓦斯突出事故不安全动作分类研究 曹家琳, 傅 贵(240)

危险预知训练对矿工心理健康和违章作业的影响 张文字, 郑建国, 金 潮, 赵怀璞, 游国强, 李兴华(243)

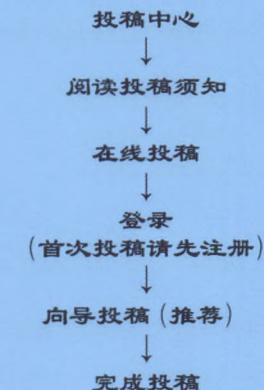
煤炭企业瓦斯治理精细化管理体系创新与实践 邢建国(247)

基于动态博弈的矿工不安全行为研究 盖丽丽(251)

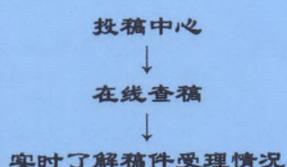
煤矿职业危害模糊聚类评价方法与应用 许满贵, 韩金子, 方秦月, 曹艳军, 宋玉金(254)



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。

SAFETY in COAL MINES

Monthly(Started in 1970)

September 2016

Vol.47 ,No.9(Total 505)

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

Study on Damping Effect of CO₂ on Gas Explosion LU Weidong,JIA Baoshan,LI Shouguo,YIN Bin(1)

Experiment on Effect of Porosity and Dynamic Loading on Permeability of Tectonic Coal Under Negative Pressure Drainage YANG Xiaopeng(4)

Research on Negative Pressure Distribution for Bedding Gas Extraction Borehole Under Creep Condition BAI Yapeng,ZUO Weiqin,LIU Mingju(8)

Experimental Study on Gas Migration Laws of Coal and Rock Fractures

SONG Shouyi,ZHANG Yinghua,YANG Fei,HUANG Zhi'an,GAO Yukun,WANG Hui(12)

Study on Characteristics of Transient Electromagnetic Signal for Coal Failure by Hammer Impact XIE Beijing,LYU Pingyang,MA Hongxing,WANG Chuan(16)

Experiment on Distribution of Particle Size and Velocity in Spray Field Under Disturbance of Airflow QIU Han,ZHU Liang,FAN Tao(20)

Experimental Study on Influence of Particle Size on Mechanical Properties and Permeability of Briquette Coal Containing Gas YUAN Mei,XU Jiang,LI Bobo,WANG Zhen,DU Yuqin,XU Shiqing(24)

Degradation Capability Experiment of Low Concentration Methane by Microorganism in Air Flow CUI Xuefeng,ZHANG Ruilin(28)

Fluid-solid Coupling Experiment Research on Water Flowing Fracture Development Laws in Overburden Rocks of Shallow Buried Short-distance Coal Seams JIN Zhiyuan,ZHAO Xiaoying,MA Liqiang,XU Mengtang(32)

Study on Gas Emission Law from Residual Coal in Goaf of Fully Mechanized Caving Face Under Single Coal Seam WANG Zhiliang,CHEN Xuexi(35)

Simulation Study on Seepage Failure of Sand Based on Fluid-solid Coupling Theory NI Hongyang,PU Hai,LI Yun(39)

Evaluation Method of Safety Monitoring for Freezing Shaft Lining WANG Lei,WANG Jianping,HONG Boqian(42)

Study on Gob-side Entry Retaining of Concrete Filling in Thin Coal Seam and Thick Limestone Roof ZHANG Jiuyu(46)

Test Study on Fly Ash Concrete Mechanical Properties YAO Wenjie,PANG Jianyong,YAO Weijing(50)

Cutting Seam Design and Study of Gob-side Entry Retaining by Roof Cutting and Pressure Relief TANG Jianquan,SONG Wenjun,SONG Libing,GUO Zhibiao(53)

Research on Structure Transformation Characteristics for Immediate Roof Key Strata with Large Mining Height CAI Zhijiong(56)

Study on Floor Stress Distribution Under Interval Coal Pillar With Flat Landform ZHANG Futao,WEI Luhai,GUO Zhiwei(60)

Technology·Innovation

Stability Controlling Technology of Supports in Large Dip Angle Face

LI Xiaomeng,CHENG Zhanbo,ZHAO Qingbo(64)

Gas Extraction Technique of Fully Mechanized Caving Face in High Gas Inclined Seam LIU Dianfu,
ZHAO Pengxiang,ZHANG Xuetao,AN Xuedong,YANG Junsheng,SUN Hongxing,YAO Xiaobo(67)

Permeability Increasing Technology of Drilling and Expanding Integration for Outburst Seam Through Beds Hole WANG Zhijian,GUI Hongwei(71)

Multipoint Control Technology for Dynamic Balance of Gas Flow Field ZHOU Yong(75)

Application of Polymer Colloid Fire Prevention Technology in Deep Fully Mechanized Caving Face FENG Liangbing,XU Chao,GAO Xingxing,LIU Dahu(79)

Fire Prevention and Extinguishing Technology with Canned Liquid Carbon Dioxide ZHANG Changshan,ZHANG Xinhai(82)

Comprehensive Prevention and Control Technology for Overlying Goaf Water Under Complex Conditions CHEN Tao,LI Yubing(85)

Deep Roadway Shear Dislocation Floor Heave Prevention and Control Based on Inclined Grooving Backfilling Technology FU Mengxiong,YU Tao(89)

Surrounding Rock Failure Mechanism and Control Technology in Deep Mining Roadways ZHANG Hongjun,LI Haiyan,LI Hongwei(93)

Principle and Technology of Non Coal Pillar Mining by Filling Wall in Full-mechanized Caving Face LU Zhigang(97)

Design·Development

Gas Overrun and Outburst Early Warning System in Chengzhuang Coal Mine

YANG Hongwei,LI Haigui,XU Guangliang(101)

Implementation of Dual Computer Switching Function for Coal Mine Safety Monitoring System ZHANG Weijie(104)

Control Technology of Three-phase Motor Operating Mechanism for High Voltage Circuit Breaker in Coal Mine With 35 kV Power Network ZHANG Hongkui(106)

Inclination Monitoring of Coal Transporting Trestle Support Based on Ground Three-dimensional Laser Scanning Technology LIN Xiaohu,YAO Wanqiang,ZHANG Yong,MA Bolin,XUE Bei,ZHANG Kunwei(110)

Design of Nondestructive Measurement Circuit for Anchor Length of Mine WANG Hui,LIU Qiuping(114)

Monitoring System for Protective Device of Inclined Shaft Runaway Car in Coal Mine JIANG Sunlun,YAO Shanhua,REN Mingyuan(117)

Mechanics Characteristics and Applicability Analysis of Anchor Cable Tray in Roadway Roof of Coal Mine ZHANG Hui,CHENG Lixing,LIU Shaowei,YU Tao(120)



煤科集团沈阳研究院
有限公司

Application·Practice

Coupling Disaster Characteristics and Prevention and Control Technologies of Gas Disasters Induced by Spontaneous Combustion in Goaf LIU Zhenling(124)

Application of Froth Dedusting Technology at Fully-mechanized Working Face in Shanjiashu Mine HU Dongliang,XU Xianbi,WANG Jibin(128)

Application of New Type of Coal Dust Capture and Fixing Technology in Mine Dust Removing TAO Longlong,LIU Chang,XIE Xiaoyun,YAN Jun(131)

Fire Area Governance Practice for Combustible Coal Seam and High Gas Fully Mechanized Caving Face ZHAO Yaming,SONG Shuanglin,SHI Jilin(134)

Application of Staged Fracturing Technology in Guizhou Songhe Coalbed Methane Development HU Haiyang,JIN Jun,TIAN Shuxuan(137)

Fire Preventing and Extinguishing Technology for Close Distance Coal Seams Mining REN Xiancai(141)
Practice of Coal Seam High Pressure Water Injection Technology at 2307 Working Face of Tangkou Coal Mine HUANG Shuxiang,WANG Haibin,QUI Han(144)

Project Practice of Mine Water Reuse and "Zero Release" in Wanli No.1 Coal Mine SUN Yanding,CHEN Dongdong,DU Xiaowu,ZHU Tao,FENG Zekang,WANG Zhikun(148)

Optimization Practice of Mine Ventilation System in Fujian Coal Mine FAN Jiafeng,FU Xiang,GAO Yongqiang,JIN Yanlong(151)

Application of Double Liquid Quick Setting Grouting Material in Strengthening of Broken Surrounding Rock ZHANG Yaohui(155)

Stability Analysis of Overlying Rock Mass of L Working Face Moving from Open-pit to Underground Mining and Slope Treatment Schemes SUN Shiguo,ZHANG Yujuan,ZHANG Yinghai,MIU Aiwei(158)

Analysis·Discussion

Distribution Predicting of Coal Seam Gas Content Based on AVO Inversion Technology in Zhaojiazhai Coal Mine SHI Jihong(162)

Study on Reasonable Sealing Depth of Bedding Holes WANG Xiting,XUAN Dequan,CAO Tuotuo(166)

Nonlinear Pressure Distribution of CH₄ and Permeability Evolution for Low Permeability Coal Samples CHEN Chaofan,WANG Rui,XUE Dongjie,ZHUO Zhuang,ZHOU Hongwei(169)

Reasons Analysis and Treatment Measures of Gas Combustion in Goaf with Hard Roof and Anticline ZHOU Yingjiang,YU Zhizhuo,GUO Hui(173)

Check Analysis for Coal Gas Desorption Model CAI Jin,MA Zhongfei,LI Lifu(176)

Determination of Reasonable Punching Coal Amount Through Hydraulic Flushing Permeability Increasing in Low Permeability Coal Seam YUAN Dezhu,LI Xuechen(180)

Optimization of Thickness for Shaft Wall Based on Analytic Hierarchy Process WANG Lei,LI Zuyong(183)

Simulation Analysis for Effect of Fault Dip on Reverse Fault Activation MIAO Wang,ZHANG Peisen,WANG Hao,LI Kai,ZHAO Shijun,KAN Zhonghui(187)

Application Analysis of Слесарев Formula in Mine Water Hazard Prevention YANG Zhibin(190)

Risk Evaluation of Coal Floor Water Inrush Based on Improved Fuzzy Analytic Hierarchy Process PAN Guoying,QIN Yongtai,MA Yafen(194)

Fracture Mechanics Analysis on Water Inrush by Mining-induced Activation of Floor Containing Hidden Faults YANG Dengfeng,CHAI Mao,JIANG Bowen,LI Bo,CHAI Jiale,ZHAO Xianwei(198)

Numerical Simulation of Deformation Failure Characteristics of Coal Seam Floor in Mining Process MA Gongshe,SUN Siqing,ZHENG Kaige,LI Chuan,LONG Weicheng,CHEN Dongdong(202)

Floor Failure Features Analysis of Faults Seam Based on Stress-seepage Coupling Effect WU Jianqiong(206)

Numerical Simulation on High-strength Pre-stressing Force Support for Roadway Surrounding Rock Based on FLAC^{3D} ZHUO Xiande,CUI Wei(210)

Analysis of Surface Rock Movement Parameters in Ningtaota Coal Mine Superimposed Mining ZHAO Bingchao,LIU Bin,WANG Jianwen,FAN Fenyan,LIU Lang,HOU Enke(213)

Mine Pressure Behavior of Coal Pillar in Deep Close Distance Protective Seam Mining YANG Rongkuan,SONG Jinhua,LIU Shuai,ZHANG Gonghui,CHEN Kunfu(217)

Influence of Bolt Pre-tightening Force on Surrounding Rock Stability of Deep Coal Roadways SONG Zongwu(221)

Research on Reasonable Interval of Large Sectional Roadways in Western Extremely Loose and Soft Surrounding Rock ZHOU Yong,WANG Jin'an(225)

Stability and Control Analysis of Surrounding Rock in Roadway with Thick Top Coal and High Sides XU Zuhu,YANG Yuliang,LI Yongming(229)

A Review of Foreign Technical Equipment on Coal Mine Emergency Rescue HUANG Junli(233)

Supervision·Management
Research on Coal Mine Gas Accident Analysis Based on PII Analysis Method ZHANG Jinggang,AN Meixiu(237)

Classified Study on Unsafe Acts in Coal and Gas Outburst Accidents CAO Jialin,FU Gui(240)

Effect of Kiken Yochi Training on Mental Health and Operation Against Rules of Coal Miner ZHANG Wenyu,ZHENG Jianguo,JIN Chao,ZHAO Huaiyu,YOU Guoqiang,LI Xinghua(243)

Innovation and Practice of Fine Management System for Gas Control in Coal Enterprises XING Jianguo(247)

Research on Miners' Unsafe Behavior Based on Dynamic Game Theory GAI Lili(251)

Fuzzy Clustering Evaluation Methods and Application for Coal Mine Occupational Hazard XU Mangui,HAN Jinzi,FANG Qinyue,CAO Yanjun,SONG Yujin(254)

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





湘潭市恒欣实业有限公司

全球“猴车”科研、制造、销售、服务领军企业

矿用绳牵引轨道式架空乘人装置（俗称“轨道猴车”）

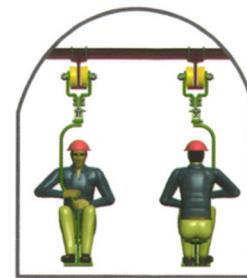


★ 产品特点

不掉绳	大运量
不飞车	任意转弯
大坡度	抱索器形式简单
无托绳轮和压绳轮	物联网技术应用

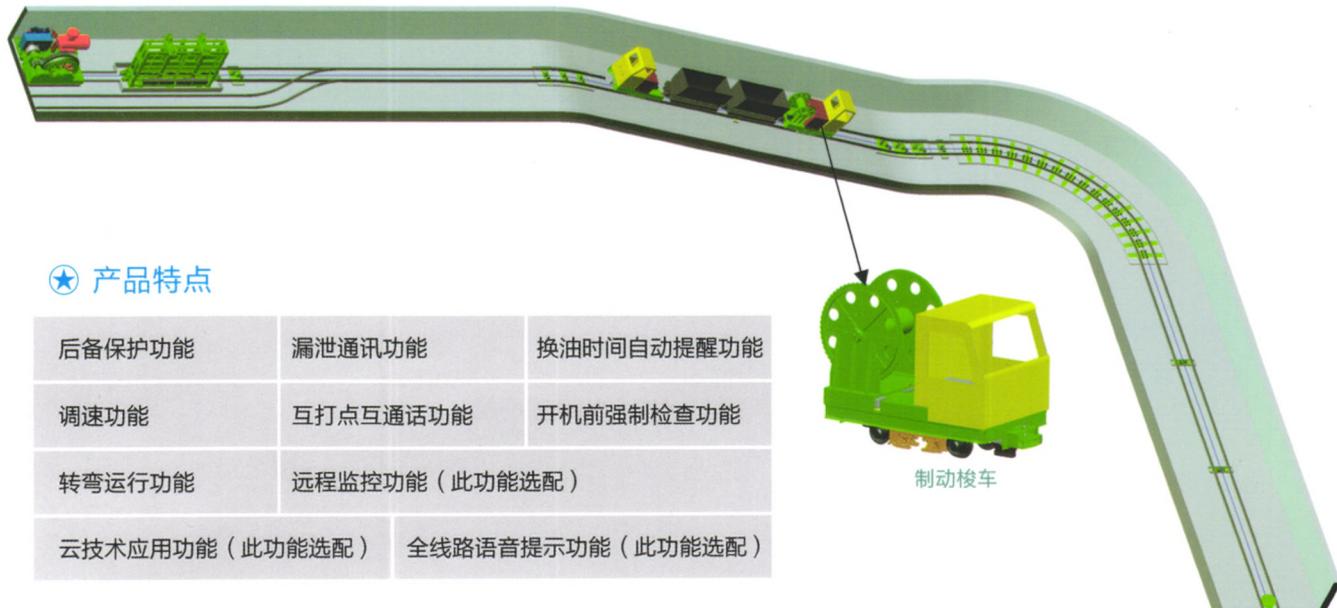


圆管轨道猴车



工字钢轨道猴车

矿用无极绳连续牵引车（俗称“梭车”）



★ 产品特点

后备保护功能	漏泄通讯功能	换油时间自动提醒功能
调速功能	互打点互通话功能	开机前强制检查功能
转弯运行功能	远程监控功能（此功能选配）	
云技术应用功能（此功能选配）	全线路语音提示功能（此功能选配）	



制动梭车

营销专线: 0731-55672999 55672019
总机: 0731-55672666
网址: www.hx12666.com
地址: 湖南省韶山市高新区

售后专线: 0731-55672016 55672022
传真: 0731-55672012 55672100
E-mail: xiao12666@163.com
邮编: 411300

