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SAFETY IN COAL MINES

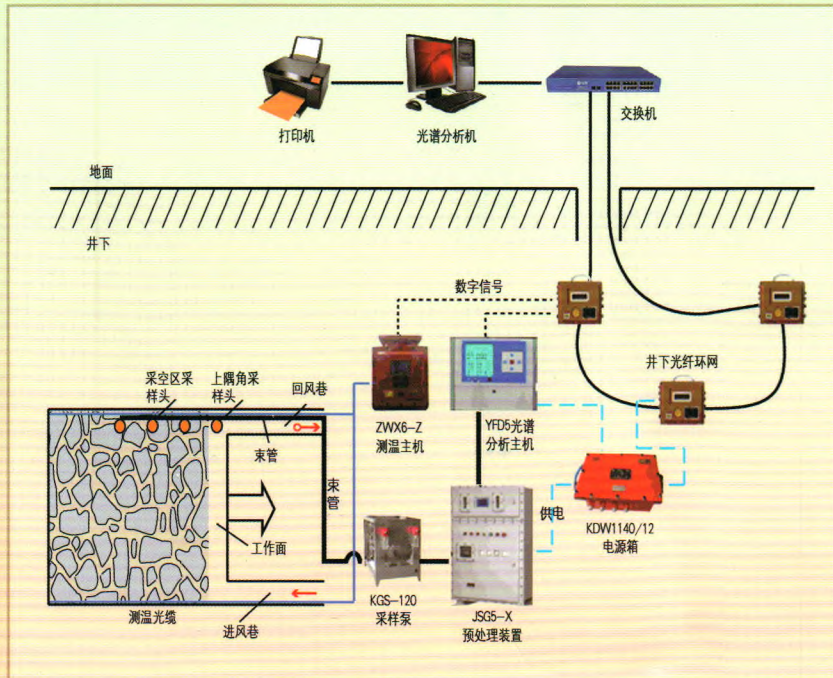
煤科集团沈阳研究院有限公司

主办

1970年创刊·月刊

井下自然发火综合监测系统

井下自然发火综合监测系统采用光谱气体分析和光纤测温技术，解决了气体长距离传输气样变化的难题，乙烯监测精度可达 10^{-7} 。主体设备为本质安全型，配套设备完善，可结合历史数据综合分析，预警准确、安全性好、可靠性高，可与防灭火装备联动，实现了管控一体化和自动化，体现了“预防为主”的自燃火灾防控原则，已成功应用于神华、陕煤、龙煤等多家大中型煤炭企业。



系统参数

光纤测温参数	测温距离/km: 8	
	测温精度/ $^{\circ}\text{C}$: ± 1	
	测温分辨率/m: ± 1	
	测温通道数/路: 6	
分析气体种类	测量范围	允许误差
甲烷/%	0~1.0	± 0.06
	1.0~100.0	真值的 $\pm 6\%$
一氧化碳浓度/ 10^{-6}	0~100	± 4
	100~500	真值的 $\pm 5\%$
	500~10 000	真值的 $\pm 10\%$
二氧化碳浓度/%	0~0.50	± 0.02
	0.50~20.0	$\pm (0.05 + \text{真值的} 5\%)$
氧气浓度/%	0~25.0	$\pm 3\% \text{ F.S}$
乙烯浓度/ 10^{-6}	0~2.0	± 0.5
	2.0~100.0	$\pm (0.5 + \text{真值的} 10\%)$

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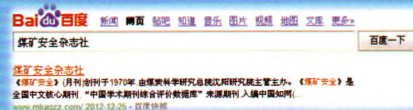
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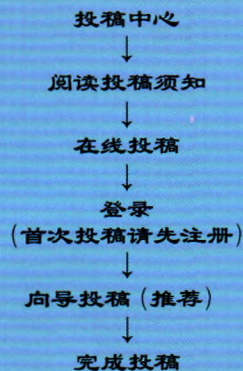
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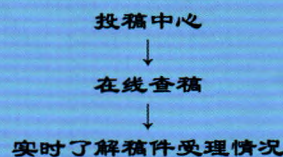
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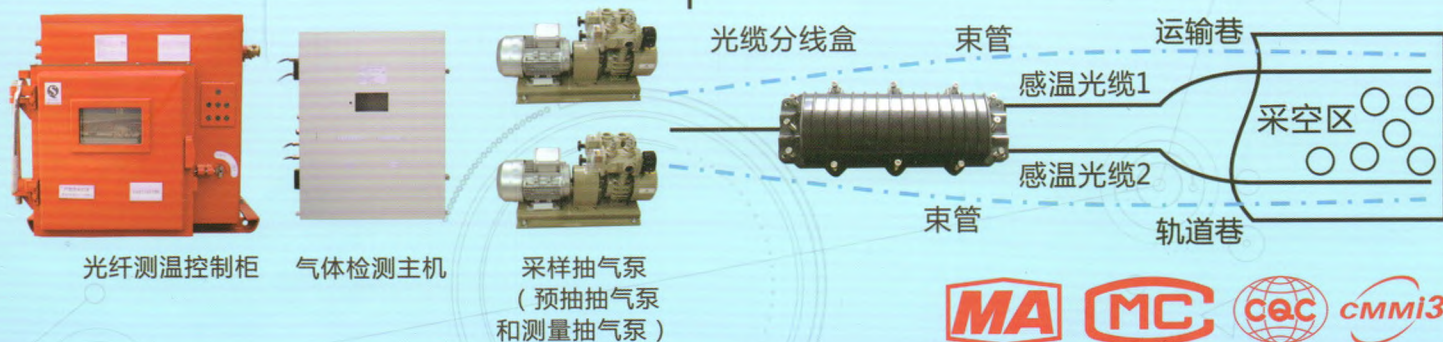
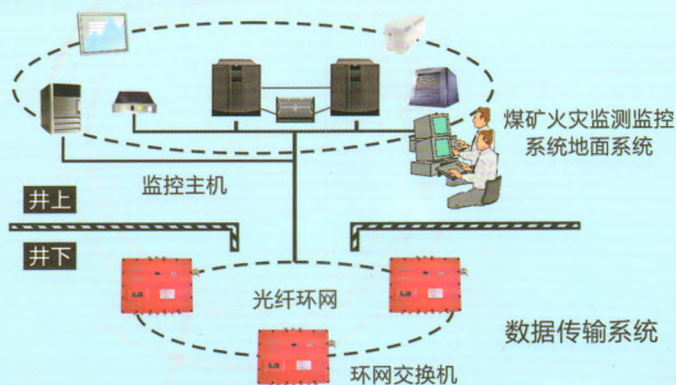
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矿用分布式激光火情监测系统是为解决现有束管系统在煤矿采空区火情监测中响应慢、管路维护困难、检测精度无法保证的缺陷，在井下采面利用光纤传感技术和激光调制吸收光谱技术连续监测采空区 CH_4 、 CO 、 C_2H_2 、 CO_2 、 O_2 等气体浓度和采空区温度，实时将采集的数据通过光纤环网上传至地面，利用火情监测系统软件实现监测、预警、防火效果评估。

性能特征

- 最完善的火灾预测模型，包含温度、 CO 、 CH_4 、 C_2H_4 、 C_2H_2 、 O_2 、 CO_2 ，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。

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