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矿业工程 研究论文

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基于瞬变电磁法的整合矿井火区分布探测方法

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Integrated Coal Mine Fire District Detecting Method Based on Transient Electromagnetic Method

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摘要 针对资源整合矿井火区探测中普通探测技术耗时长、工程量大,且难以直接定位火区范围等问题,研究了基于瞬变电磁法的火区分布探测方法。以北祖矿为例,在井下全空间条件下,结合地质资料和现场地质情况,采用瞬变电磁仪对北祖矿9209风巷上覆煤层进行超前探测和剖面探测,反演计算形成超前、剖面视电阻率图,根据巷道上覆煤层在视电阻率图中的响应特征,通过定性分析确定巷道上覆煤层的自然发火区域。结果表明,基于瞬变电磁法的整合矿井火区分布探测方法能够准确定位火区分布范围,可为打钻探测及灌浆堵漏等矿井防灭火工程提供科学依据,明显提高工程效率及效果。

关键词 : 整合矿井, 火区分布探测, 瞬变电磁法, 视电阻率

Abstract : Conventional detection technologies for fire areas in integrated coal mines are time-consuming with large volumes of work, and it is difficult to directly locate the fire areas. To improve the technology, the transient electromagnetic method was applied in detecting fire zone distribution. Taking the Beizu Mine for example, this study used the TEM to conduct advanced detection and profile detection of the overlying coal bed of 9209 roadway under the condition of full space in the coal mine. Combined with geological data and conditions at the site, the advanced and section map of apparent resistivity was obtained by inversion calculation. According to the characteristics of response of the overlying coal bed, the natural fire areas were located by qualitative analysis. Practical application shows that the detection method based on transient electromagnetic method is able to locate the distribution of fire areas accurately, providing scientific basis for mine fire prevention, such as drilling exploration and grouting leakage stoppage, significantly improving project efficiency and effects.

Key words : integrated coal mine fire zone distribution detection transient electromagnetic method apparent

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