

本期目录 | 下期目录 | 过刊浏览 | 高级检索  
页] [关闭]

[打印本

### 论文

## 大变形巷道顶板可接长锚杆支护系统性能研究

刘洪涛, 王飞, 王广辉, 赵希栋, 汤达, 于明江

中国矿业大学(北京) 资源与安全工程学院, 北京 100083

### 摘要:

为解决大变形巷道支护成本高、效果差的技术难题, 研发了一种新型可接长锚杆。针对大变形巷道顶板变形破坏特征进行研究, 对比分析了普通锚杆、传统锚索及可接长锚杆的受力与变形特性, 构建了围岩-支护系统本构模型, 提出了顶板可接长锚杆支护系统, 并应用于五家沟煤矿5203回风巷道, 有效地控制了顶板的持续变形。结果表明: 4 m可接长锚杆的最大延伸量为685 mm, 破断载荷为195 kN, 在充分发挥高延伸性的同时, 保证了较高的支护阻力; 顶板可接长锚杆支护系统后期的稳定性及支护强度均大于顶板锚索支护系统。现场监测表明, 采用可接长锚杆支护系统维护的顶板, 下沉量减小了33%以上, 支护强度在160~180 kN的可接长锚杆的比例可达87.5%, 实现了强力支护与有效让压。

关键词: 可接长锚杆; 大变形巷道; 本构模型; 高阻让压

## Research on lengthening bolt roof support system performance in largely deformed roadway

### Abstract:

In order to solve technical problems of largely deformed roadway, such as high support cost and poor support effect, a new style lengthening bolt was researched and developed. The paper studied deformation and failure feature of largely deformed roof, and analyzed force and deformation characteristic of lengthening bolt by comparison with ordinary bolt and traditional cable. Besides, the constitutive model of surrounding rock-support system was established, then, the lengthening bolt roof support system was put forward and successfully applied in 5203 ventilation roadway in Wujiagou Mine, which effectively control the sustainable deformation of roadway roof. The research results show that maximum elongation and breaking load of 4 m lengthening bolt respectively are 685 mm and 195 kN. Furthermore, the lengthening bolt not only gives full play to its high elongation, but ensures high support resistance. Besides, both of stability and support strength of lengthening bolt roof support system are superior than roof cable support system in late period. Field observation results show that the subsidence amount decreases more than 33% when the roof is supported by lengthening bolt roof support system, and the proportion of those lengthening bolt with 160-180 kN support strength is almost 87.5%, which achieves the goal of strong support and yield pressure.

Keywords: lengthening bolt; largely deformed roadway; constitutive model; high resistance yield pressure

收稿日期 2013-11-20 修回日期 2014-02-20 网络版发布日期 2014-04-22

DOI:

基金项目:

国家自然科学基金资助项目(51204187, 51234005); 北京高等学校青年英才计划资助项目(YETP0928)

### 扩展功能

#### 本文信息

- ▶ Supporting info
- ▶ PDF(1363KB)
- ▶ [HTML全文]
- ▶ 参考文献PDF
- ▶ 参考文献

#### 服务与反馈

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ 引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶ 浏览反馈信息

#### 本文关键词相关文章

- ▶ 可接长锚杆; 大变形巷道; 本构模型; 高阻让压

#### 本文作者相关文章

- ▶ 刘洪涛
- ▶ 王飞
- ▶ 于明江
- ▶ 赵希栋
- ▶ 王广辉
- ▶ 汤达

#### PubMed

- ▶ Article by Liu,H.S
- ▶ Article by Yu,f
- ▶ Article by Yu,M.J
- ▶ Article by Diao,X.D
- ▶ Article by Yu,A.H
- ▶ Article by Tang,t