

Exploration of Mining Engineering Mining Technology Equipment and Construction Safety Management

Guyao Liu

Tongling Nonferrous Metals Co., Ltd. Tianmashan Gold Mining Co., Ltd., Tongling 244000, China

Abstract: With the rapid development of high-tech, mining engineering has also made significant progress compared to traditional mining methods and technologies. However, the development of mining engineering, mining equipment, and construction has also brought new safety management issues. Based on this, this article will first analyze common mining engineering mining technologies such as comprehensive types, mine collapses, and gently inclined layers, and then propose countermeasures on how to improve the quality of mining engineering construction safety management, aiming to provide some reference for the development and application of mining engineering mining technology equipment and construction safety management.

Keywords: Mining engineering; Mining technology; Security management

Mineral resources, also known as mineral resources, are a non renewable resource and an important material foundation for China's economic and social development. They are also known as "industrial grain". In recent years, China's mining engineering mining technology equipment and construction safety management have been continuously upgraded and optimized, promoting the rapid development of the mining industry. At present, most mines in China are mainly mined underground. When conducting deep mining, they are often affected by different geological or hydrological factors, which can easily lead to safety accidents. This not only increases the difficulty and risk of mining engineering, but also greatly threatens the personal safety of construction personnel. At the same time, it also reduces the overall production efficiency and quality of mining engineering. Therefore, relevant construction enterprises must strengthen in-depth research on mining technology, equipment, and construction safety management, strengthen the cultivation of safety awareness and professional ability of construction personnel, and lay a solid foundation for the development of China's mining industry.

I. Analysis of commonly used mining techniques in mining engineering

1. Comprehensive mining technology

In order to improve the output and quality of mineral resources extracted, mining enterprises usually choose appropriate mining engineering mining techniques and equipment based on the geographical and environmental conditions of mining engineering. And comprehensive mining technology is one of the most common mining engineering mining technologies currently available. Among them, the main mining technologies are hard top panels and hard top coal. Hard roof panel is a comprehensive type of mining technology that combines several other technologies, emphasizing the effective treatment of inclined roof panels based on the principles of low pressure and deep burial. In the application process, certain hydraulic fracturing techniques also need to be integrated. In practical application, hard top panel technology is often combined with step collapse technology to improve recycling efficiency and ensure construction safety. Therefore, it is also considered a control technology. And hard top coal is also a comprehensive type of mining technology, with the main function of extracting large mineral resources. In practical applications, it emphasizes the flexible application of blasting technology, high-pressure water injection technology, etc. By scientifically applying comprehensive mining techniques, it is possible to effectively increase mining output while ensuring construction safety.

2. Mining collapse mining technology

In the mining process of mining engineering, construction enterprises can improve the mining efficiency of mineral resources by applying mining collapse mining technology. This technology has a wide range of applications and a long service life, which has important practical application value in mining engineering. Especially in surrounding rock areas, mining collapse mining technology has shown better mining results, achieving effective management of ground pressure formation. Layered collapse and stage collapse are specific subdivision techniques of mining collapse mining technology. In practical application, they should be used in conjunction with corresponding mining engineering machinery and equipment according to the on-site situation to ensure the personal safety of workers in mining operations. In addition, mining collapse mining technology can also reduce the construction intensity of mineral mining, alleviate the workload of workers, and reduce mining costs, thereby creating more economic benefits for enterprises.

3. Mining technology for gently inclined layers

In the process of mining engineering, geological structures with certain construction difficulties are often encountered in areas, such as mines with gently inclined layers. This type of mine has high difficulty in mining and requires high mining technology and equipment. Therefore, in the mining of such mines, construction companies should flexibly apply the mining technology of gently inclined layers based on specific mining conditions. Among them, special attention should be paid to: firstly, choose lighter and smaller mining equipment as much as possible to maximize mining efficiency and the quality of the extracted minerals. The second is to accurately analyze the thickness of the mineral layer and monitor whether the support structure of the relatively thick mineral layer is stable, so as to ensure the smooth progress of mining construction. For relatively thin mineral layers, a comprehensive consideration should be given to whether their mineral resources

have been damaged by compression.

II. Countermeasures for improving the safety management of mining engineering construction

1. Introducing modern mining technology and equipment

With the advent of the Internet era, information technology has penetrated into all areas of people's daily life, bringing vitality to all industries. Given the increasing trend of intelligent mining equipment, relevant construction enterprises should actively introduce modern mining technology and equipment, in order to create a safer working environment for workers compared to traditional mining construction, effectively protecting the lives and health of workers, and further improving the efficiency and economic value of mining engineering. In this regard, construction enterprises should increase their investment and use of modern mining technology and equipment, strengthen the safety management of mining engineering construction with more advanced technology and equipment, better prevent small winches from flowing into the mine, select appropriate equipment, and determine its performance and normal operation before use, while paying attention to the maintenance and management of construction equipment. In addition, modern technological means should be utilized to build a mining engineering production safety system, forming an intelligent, information-based, and highly interconnected mining engineering construction management system, which can monitor and manage the entire mining construction process from multiple perspectives. Through this method, the smooth transmission of information during the mining and construction process is ensured, so that if problems occur during the mining and construction process, they can be detected and dealt with in a timely manner, thereby minimizing the negative impact of the problems.

2. Optimizing Construction Management of Mining Engineering Mining

In the process of mining engineering and construction, construction management is also a crucial task for enterprises. Enterprises should strengthen their attention to construction management and establish a sound management system for mining engineering and mining based on the specific conditions of the mining construction site and relevant laws and regulations. Corresponding management mechanisms should be established to make the construction operation procedures clear. According to the key points of mining construction operations, corresponding construction specifications are set. In actual construction operations, workers are required to strictly follow the corresponding specifications for mining mineral resources, and cooperate with mining equipment to make construction more scientific and efficient, in order to prevent injuries to workers caused by improper use of equipment. On this basis, it is necessary to further strengthen the safety management system of construction enterprises, and gradually improve the content of the system according to the actual situation, and formulate a series of scientifically reasonable and practical construction rules and regulations. At the same time, corresponding punishment measures should be set up to ensure that all staff members can consciously and strictly abide by them, and effectively ensure their safety. In addition, during the construction period of mining engineering, enterprises should also be equipped with monitoring facilities to monitor the construction operations of workers 24 hours a day, and implement a responsibility system to ensure that workers in different positions have a clear understanding of their job responsibilities. In addition, specialized safety management personnel should be set up to provide good safety education for construction workers, actively innovate safety management education methods, and raise the awareness of safety work among workers. Daily construction operations should be carried out in accordance with regulatory standards to promote the orderly development of mining engineering and construction.

3. Strengthen the supervision mechanism of mining engineering mining

In the process of mining engineering construction, construction enterprises should also pay attention to supervision and management work, comprehensively inspect all aspects of the mining construction site, strictly control the mining construction operations at each stage, reduce unreasonable problems and phenomena in construction, and further reduce the safety risks of construction operations. At the same time, the most important thing during inspection is to conduct a detailed inspection of the mechanical equipment used in mining engineering to avoid accidents during operation. In this regard, construction companies should arrange fixed staff to regularly repair and maintain mining machinery and equipment. Mining machinery and equipment that have been used for a long time or have a long service life should be inspected daily, especially the internal components should be inspected, and old parts should be replaced in a timely manner to ensure the normal operation of mining machinery and equipment, as well as construction safety. In addition, construction companies also need to comprehensively manage the mining process and operations of their staff, monitor their work in real time, and eliminate substandard construction operations, which also helps to continuously improve their professional skills. In order to make the supervision mechanism of mining engineering more effective, construction enterprises can implement a clear management system of rewards and punishments, reward employees with excellent work performance, and punish employees who do not meet the actual operation standards, promoting them to continuously optimize their professional skills and comprehensively improve the safety and effectiveness of mining engineering construction.

4. Enhance the safety awareness of construction personnel

Generally speaking, the on-site environment for mining engineering and construction is relatively complex. Therefore, it is not only necessary to strengthen the management of the construction site and improve the efficiency and quality of mining engineering through various management methods, but also to give sufficient attention to the personal safety of workers to ensure their personal safety during the mining process and prevent the occurrence of major safety incidents. Therefore, construction enterprises should pay attention to enhancing the safety awareness of construction personnel, improving various safety management measures, and taking corresponding management

measures in combination with the specific conditions of mining engineering, in order to achieve better safety management results. Based on this, construction enterprises should continuously strengthen the safety awareness of their staff, so that they strictly comply with relevant regulations and standards during the construction process to ensure their personal safety. At the same time, enterprises should increase safety education for mining engineering and construction, such as hanging relevant safety slogans on mining sites, so that staff can understand the safety priorities of mining engineering and guide them to establish correct safety concepts unconsciously. Or by using warning videos from typical cases, staff can intuitively understand the dangers of safety accidents and the safety accidents that are prone to occur during construction operations. Only in this way can they pay attention to potential safety accidents in actual mining engineering and construction, and reduce the occurrence of accidents. Construction enterprises should advocate that workers should always be vigilant during the actual construction process and master common emergency response measures, in order to better ensure safe construction.

5. Building a High Quality Mining Engineering Construction Team

Staff are the basic guarantee for the smooth progress of various mining engineering and mining work, and their comprehensive quality will have a significant impact on the construction efficiency of mining engineering and mining. Therefore, construction enterprises need to build high-quality mining engineering construction teams. Ensure that the staff can fully utilize mining technology and implement the rules and regulations related to safe mining construction operations formulated by the construction enterprise. Therefore, construction companies need to cultivate the comprehensive quality of their staff in a targeted manner, so that they can respond and handle unexpected events in the construction process as soon as possible. On the one hand, construction enterprises should enhance the training of basic skills for their staff, so that they are proficient in mining technology, proficient in using mining equipment, and have a good professional level. At the same time, construction companies need to conduct regular professional skill tests on their staff, and only those who pass the tests and obtain a work permit can start working. On the other hand, construction companies should improve employee benefits and introduce a group of innovative and applied talents with excellent professional backgrounds and professional qualities to enhance the talent structure of the construction team.

III. Conclusion

In summary, in order to further improve the innovative development of mining engineering construction, relevant construction enterprises should deeply explore the application of modern mining engineering mining technology and equipment, and contribute to the development of China's mining industry by introducing modern mining technology and equipment, optimizing construction management of mining engineering mining, enhancing the supervision mechanism of mining engineering mining, enhancing the safety awareness of construction personnel, and building a high-quality mining engineering construction team.

References

- [1] Ruidong Guo. Analysis of Mining Technology and Construction Safety Management in Open Pit Mines [J]. Inner Mongolia Coal Economy, 2023, (15): 91-93.
- [2] Xianbin Qin, Wei Xu, Shuqiang Li. Research on Mining Technology and Construction Safety in Mining Engineering [J]. Metallurgy and Materials, 2023,43 (06): 17-19.
- [3] Long Wang, Lihai Shan, Jianli Hu. Research and Discussion on Mining Technology and Construction Safety in Mining Engineering [J]. China Metal Bulletin, 2023, (03): 28-30.
- [4] Lei Huang. Application of Intelligent Safety Monitoring System in Mining Engineering [J]. China Metal Bulletin, 2023, (01): 29-31.
- [5] Jia'an Long. Underground Mining Methods and Safety Control Measures for Metal Mines [J]. China Metal Bulletin, 2022, (08): 28-30.