Study on Remote Sensing Dynamic Monitoring of Geological Environment

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Abstract: With the continuous development of science and technology, remote sensing technology has become more and more mature and more advanced in our country, and the application of remote sensing technology to the monitoring of geological environment is also an important research problem in continuous improvement in recent years. China has a vast land area, rich mineral resources, strong geological diversity and complex geological environment, and the geological exploration of the origin of mineral resources is a prerequisite for the rationality of mineral development. Therefore, the remote sensing dynamic monitoring of geological environment plays a decisive role in mineral development. With the development of mineral resources, China's mineral environment is getting worse and worse. In order to ensure the long-term development of mineral resources and the safety of mining personnel. Remote sensing dynamic monitoring of geological environment in mineral areas is of great significance. Based on this, this paper will study the remote sensing monitoring data of mining, and provide help for the remote sensing monitoring of geological environment of mineral development in China.

Keywords: Geological Environment; Remote Sensing Technology; Dynamic Monitoring

1. Introduction

Remote sensing dynamic monitoring of geological environment before mineral development is an important project and a key link in mineral resources development in China. The dynamic monitoring of geological environment needs many technical conditions as the premise, and requires operators to deal with the data very strictly. In this project, science and technology need to be used as the support and information technology as the platform to help the staff to monitor the changes in the geological environment in time. The following will analyze and discuss the matters needing attention when conducting geological environmental monitoring of mines and the technical operations that need to be used.

2. Analysis of natural disasters in geological environment during mining

In the last century, China's development of mineral resources is very large, but due to the backward technology, there is no protection of mineral resources, which leads to the adverse impact on the geological environment around the mineral resources. Serious over exploitation will even lead to damage to the mountain itself, and eventually lead to the health of people and animals around. For the mining of mineral resources, if the geological detection is not carried out in advance, there will

be hidden dangers for the safety of mining personnel. However, due to the great demand for minerals in China, the development of mineral resources can not be interrupted. Efficient use of scientific technology to develop mineral resources reasonably can minimize the damage to the surrounding environment[1]. First of all, some common mineral geology that will appear natural disaster phenomenon will be listed. Remote sensing dynamic monitoring of geological environment around mineral resources can predict the occurrence of natural disasters, so as to prevent them.

2.1 Landslide

Landslide is one of the most common natural disasters in the development of mineral resources, but most of them are caused by human beings. Due to the over exploitation of mineral resources, there are fewer green plants on the surface of the mountain, the land is exposed to the sun, and there is no root connection in the soil, which is easy to slide. When the inclination angle of the mine is too large, the soil is loose, and it is easy to slide down in case of rain or earthquake. Even the vibration of some large machines in human work will lead to landslides. When the rain water is immersed in the soil, it slides down the mountain and drives some boulders exposed due to construction to form debris flow, which may endanger people's lives. Remote sensing technology is used to monitor the surface soil quality of the mountain to prevent landslide and loss.

2.2 Mountain collapse

When the inner mineral resources of the mountain are developed to a certain extent, there will be hollows in the interior of the mountain. The collapse is completely caused by the over exploitation of mineral resources in the mountain. Due to the exploitation of mineral resources, the upper layer bears too much pressure along the wall, and the supporting structure can not support the weight of the mountain. The stress structure of the whole mountain is damaged and may eventually lead to collapse. Once the mountain collapses, the injury to the people who are working on the mining is fatal. In recent years, most of the major dangerous events in mineral resources development in China are caused by collapse. Once the mine collapses, it is almost impossible to develop again. When developing resources, remote sensing

dynamic monitoring of the internal structure and cavities of the mountain can detect whether the mountain is in danger of collapse in time. And according to the situation, support the mountain in time to fill the support to strengthen the mountain to ensure subsequent development. Real-time remote sensing dynamic monitoring can make early warning before the collapse of the mountain, withdraw the important equipment and staff in time, minimize the economic losses caused by the collapse of the mountain, and deal with it to ensure the long-term development of minerals[2].

2.3 Industrial pollution

In the development of mountain resources, sewage or toxic chemicals are often discharged, and even dust and slag in the mining process will cause secondary injury to the body of mining personnel. These industrial wastes are concentrated in the interior of the mountain and pollute the surrounding environment, causing root damage to the minerals. At the same time, there are some chemical products, which can also cause damage to the staff. The dust inside the mountain enters the staff's lungs, causing a series of lung diseases. Remote sensing technology is used to monitor the internal pollution of mineral mountain in real time, so as to control the pollution caused by mining process in a scientific way, so as to ensure the personal safety of staff and the sustainable development of mineral resources[3].

3. Technologies for dynamic monitoring of geological environment by remote sensing

Compared with the past manual dynamic detection of geological environment, the development of science and technology makes remote sensing dynamic detection more convenient and has more advantages. Compared with human detection data, remote sensing detection has fewer loopholes, more timely access to information, and shorter response time. After getting the data, the operator has enough time to analyze and process, and can get the overall state data of the mountain. In addition, a comprehensive analysis of the mine environment can timely let the staff to remedy and deal with the problems, put forward more thoughtful protective technology for the development of mineral resources, and improve work efficiency and safety. The enhancement of China's com-

prehensive national strength is inseparable from the sustainable development of mineral resources. Mineral resources play an important role in the development of our country. For the good development of my country's mineral resources, convenient management of remote sensing technology must be used to scientifically develop mineral resources to avoid blind development from causing damage to mineral resources, remotely monitor the geological environment to realize the digital management of mineral resources, and use data to detect the situation of mineral resources in order to deal with problems in a more timely manner [4].

Computers are more accurate in operating equipment compared to previous manual operations, and using artificial intelligence to manage data can make people's reaction speeds timelier and more accurate when an incident occurs. The extraction of information is more precise, and we can make the right choice in emergency situations.

The platform of network on information technology basic is an important part of remote sensing monitoring. The development of computers in various industries and fields is obvious to all. With the popularity of computers in the mineral industry, remote sensing systems have also entered the field of minerals. Analyze mountain resources through the Internet and combine the data from on-site surveys with the data on the Internet, and timely select suitable methods to judge the mountain situation and find the best solution to solve it.

The biggest feature of the operation of remote sensor control system is that it can be operated remotely. The staff can remotely acquire and analyze mountain information, and make plans in a relatively safe environment. In this way, remote management is used to provide information assistance to the working personnel, ensuring the safety of the staff.

Radiation correction is to survey the mountain by using radiation on site to reduce the influence of external factors on the data during mountain analysis, which can ensure the accuracy of remote sensing monitoring data, restore the original graphics of the mountain, and facilitate data analysis by the operator. Radiation correction is an important means for the staff and the site to conduct surveys.

Image fusion is mostly used in remote sensing satellites, and the acquisition of ground graphics through satellites is clearer and more complete. Obtain the mountain data through different orientations, and obtain more accurate data through image fusion. Image fusion can improve the accuracy of data.

There are many ways to extract information. Multiple ways of information extraction from mine geological environment data can effectively avoid other factors that affect the data. When remote sensing monitoring analyzes data images, it needs a variety of information for feedback to obtain more accurate data.

At present, remote sensing technology is not mature enough. Most of the data needs to be collected by manual on-site survey, and the data needs to be analyzed by technicians. This has increased the economic loss of mineral resource development. The development of remote sensing monitoring technology is mainly the development of artificial intelligence information extraction technology. Data need to be used to monitor the impact of unfavorable factors and possible disasters during the development of minerals. Through timely monitoring, the unfavorable factors can be grasped and the natural disasters and pollution of the mountains can be eliminated, which will enable resource development to go further and conform to the concept of sustainable development in China.

4. Specific methods of remote sensing dynamic monitoring of geological environment

Landslide monitoring has adverse effects on the surface of the mountain during mining, which may lead to landslides. Remote sensing monitoring technology can detect the situation of the mountain in time and determine whether there will be a danger of landslide through the analysis of the city and the surface clouds of the mountain. This way to landslide monitoring has high rigor and accuracy in date processing, is timelier in the acquisition of information than manual detection, and has less time in response. Therefore, the operator has a longer time to analyze and process the data that more data of the overall condition of the mountain can be got. These data perform a comprehensive analysis of the real estate environment of the mine to find out the problems. Remote sensing monitoring technology needs to analyze the surface of the mountain through images. It is necessary to use a lot of data to evaluate the unknown hazards,

and analyze various conditions to lay the foundation for landslide detection.

For collapse monitoring, the mountain collapse occurred extremely quickly. Periodic inspections of the interior of the mountain in time can be conducted to inspect the mines for a long time. For the precursor of the collapse, it is important to adopt a suitable plan to remedy it through technical analysis, such as strengthening the mountain and adding fillers to reduce unnecessary losses and personnel. Through remote sensing detection, the dual-network can determine the law of collapse and the degree of collapse to analyze whether the mining of mineral resources needs to be stopped, so that the development of mineral resources can be longer. Using scientific technology to rationally develop mineral resources can minimize damage to the surrounding environment. Some common natural disasters that occur in mineral geology will be listed as the first step, which requires remote sensing dynamic monitoring of the geological environment around minerals to predict the occurrence of natural disasters and prevent them.

Regarding pollution detection, it is mainly through the detection of chemical products produced during development and dust and mineral impurities caused by internal development. We can make full use of remote sensing monitoring technology to obtain polluted data of the geological environment for management and assist staff to obtain more accurate judgments. This has important strategic significance in the remote sensing dynamic detection of mine geological environment[5].

5. Conclusion

China's efforts in remote sensing monitoring are not enough, and there is still a certain gap compared with western developed countries. However, the achievements of the efforts in this field in recent years are obvious. The popularization of remote sensing monitoring is a huge progress for China's resource development. Remote sensing monitoring will soon become the primary monitoring method in the field of mineral development in China. Western developed countries have applied remote sensing monitoring to various fields and have achieved considerable success. China should continue to study remote sensing monitoring technology, and use more effective data and accurate analysis to protect resources and roads. There is still a long way to go to promote the development of China's mineral resources to implement the concept of environmental protection, reduce the disasters that occur in mining areas. Remote sensing monitoring can greatly reduce the danger in the process of mineral development and ensure the longevity of resource development, which shows the importance of remote sensing monitoring in geological environmental exploration[6].

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