

RESEARCH ARTICLE

Probe into Measures to Improve the Accuracy of Coal Mine Geological Survey

Pengfei Zhang

Shanxi Jincheng Anthracite Mining Group Co., Ltd., Jincheng, Shanxi, 048000, China

Abstract: In the process of China's development, various resources need to be used effectively. Among them, coal resources are one of the important basic guarantees in people's life and production. The continuous use of coal resources in development has made mining more and more difficult, and put forward higher challenges to the mining process and the geological survey process. During the construction of coal mining projects, it is necessary to carry out effective measurement data, accurately improve the underground construction situation of the entire coal mine, make detailed data sorting of underground mines, and make correct judgments. Based on the actual situation, the thesis improves the accuracy in the process of coal mine geological survey, analyzes the related reasons, and adopts scientific measures to improve the maximization of coal mining.

Keywords: Coal mine; Geological survey; Accuracy; Improvement

Citation: Pengfei Zhang. 2019. Probe into Measures to Improve the Accuracy of Coal Mine Geological Survey. *International Journal of Geology*, 4(1): 4-8. <http://doi.org/10.26789/IJG.2019.01.002>

Copyright: Probe into Measures to Improve the Accuracy of Coal Mine Geological Survey. © 2019 Pengfei Zhang. This is an Open Access article published by Urban Development Scientific Publishing Company. It is distributed under the terms of the Creative Commons Attribution-Noncommercial 4.0 International License, permitting all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited and acknowledged.

1. Introduction

In recent years, China's coal mining industry has developed rapidly. In order to effectively and comprehensively ensure the long-term and stable development of coal mining industry, the importance of measurement is self-evident. Coal mine geological survey is the foundation of the whole production operation, and its function is self-evident and immeasurable. As we all know, surveying is a work that can't tolerate any carelessness, especially the important work of coal mine geological survey, which requires the relevant staff to keep a rigorous and serious attitude and a steady and down-to-earth style. If careless phenomena occur, it is easy for a little mistake to affect the whole work in an all-round way and even bring irreparable losses to workers. Therefore, a strict working attitude is very important.

2. Analysis of the Importance of Coal Mine Survey Work

Coal mine survey is very important in coal mining. If any construction happens during the survey, it may lead to major accidents, which will cause great potential safety hazards to workers' lives and property. Most of the coal mine production is under a mine as deep as several hundred meters. After long-term mining, many long-term

coal mines will lead to complicated pipelines in the mine. Because the accuracy of coal mine measurement plays an important role in coal mine production safety, during the process of measuring it, we must ensure the production safety and prevent the occurrence of safety problems. It is necessary to strengthen staff's safety awareness and solve problems in coal mine survey through professional theoretical knowledge and practical experience.

3. Factors Affecting the Accuracy of Coal Mine Geological Survey

Due to the development of China's economy, its accuracy requirements are constantly improving. At the same time, after the accuracy is improved, it can also ensure the safe and effective operation of the whole production process. In the process of coal mine detection, many links are involved, such as construction survey, data collection, data operation and drawing survey drawings, etc. According to the measured data, we should do a good job of sorting out and strengthen the effective connection of each link. If there is a problem in a certain link, it will lead to severe impact on subsequent links, and the final accuracy will be quite different. However, from the analysis of factors affecting the measurement accuracy, we should start from the following aspects.

3.1 Selection of Measuring Equipment and Its Accuracy

In the process of geological survey, we should rely on professional equipment to make accurate measurement values. Equipment is the basis of measurement accuracy, and combining with the accuracy of surveying and mapping data, we can scientifically analyze the actual geological situation. Before the measurement, the measuring equipment should be proofread to avoid the deviation of the measurement results due to the lack of accuracy of the equipment. It is necessary to select the surveying and mapping instruments by considering the requirements of measurement accuracy and the working environment, and in addition, carefully check and proofread the selected instruments, so as to effectively avoid the interference of unqualified instruments on the measurement results.

3.2 Screening of Geological Survey Points

Under the influence of geological mining, geological survey points, such as underground leveling points and triangle points, will change in the survey process, and the parameter position data will also change, which will have a corresponding impact on the later survey data. In the process of geological data detection, analyze according to the data to reduce the difference of measurement results. Therefore, in the process of development, before the geological survey work, the measurement points should be corrected, screened and determined to ensure the effective implementation of the survey work, so as to ensure that the position of the detection points will not change during the construction period.

3.3 Skill Level of Staff

Important components are indispensable in any task of creating production, and related professional and technical workers are indispensable in the accuracy of underground geological survey. Therefore, in the survey work, the quality and habits of professional and technical workers will have an important impact on the survey results, and in severe cases, some workers will make mistakes in operation, resulting in errors in the survey results.

4. Coal Mine Geological Survey Accuracy Improvement Measures

4.1 Improve the Preparatory Work

It is an important prerequisite to ensure the accuracy of measurement to do the preparatory work well. Relevant personnel should do the preparatory work well, so as to

reduce the measurement errors. Specifically, it can be divided into the following points: (1) Before the measurement, the corresponding equipment should be prepared, and the parameters of the equipment should be set well, and the corresponding team work should be done well, so that the data gap generated in the work can be reduced and the errors caused by the equipment can be reduced as much as possible. (2) Before carrying out relevant work, professionals should be allowed to conduct on-the-spot investigation and make an assessment according to geology and environment, so as to find better treatment measures and reduce the occurrence of other problems in the measurement process. (3) The work has a good audit system, and relevant staff can constantly improve the system according to the current actual situation, so as to conduct a comprehensive audit of the data, ensure the validity of the data, and thus reduce errors.

4.2 Check the Original Measurement Data

In the actual survey work, if the relevant staff want to ensure the validity of the data, they need a reference data for comparison. Therefore, it is very important to ensure the accuracy of the initial data, which can be used as the basic content of current mine survey. When carrying out related work, the staff can use the initial data as parameters to compare the measured data, and use the initial data to analyze it, so as to quickly find out the abnormal problems, and then find out the reasons for the abnormal problems, and use effective treatment measures to deal with them. In addition, they can also record the problems this time, and once this type of problems occurs again, they can be better dealt with accordingly. In addition, there are too many initial values when surveying and mapping the mine. In order to ensure the normal operation of the operation activities, a detailed initial check and recheck program must be created before the accounting activities to ensure that the initial values will not be lost, and the accuracy of the initial values can also be improved. There are many contents in mine geological survey, and its structure is cumbersome, and the related contents are all connected one by one. If there are mistakes or omissions in the process of launching the work, it will cause great errors. Therefore, the relevant personnel should arrange the relevant contents in the process of launching the work to ensure the smooth development of the process without missing data information.

4.3 Increase the Training of Professional Surveyors

We should attach importance to daily training and en-

hance the control of surveying and mapping professionals. The fundamental of mineral geological surveying and mapping lies in having professional surveying and mapping workers. The technical level and quality of relevant workers will directly play an important role in future surveying and mapping achievements. Therefore, in order to improve the accuracy of surveying and mapping, mining companies must focus on the training skills of surveying and mapping workers, and enhance the relevant governance. There are various learning methods, for example, sending related technical workers to other mines to study, so as to improve the technical ability of surveying and mapping workers. In addition, we can also focus on the examination and testing of surveying and mapping workers, so as to encourage professional workers to improve their own level and accomplishment independently. It is necessary to arrange the relevant work in a normative way in order to avoid the surveying and mapping errors caused by the thought factors to the greatest extent.

4.4 Accurately Draw Design Drawings

Before carrying out relevant work, it is necessary to draw the project and implement the scheme through the drawing content, which is the basic content of this work. Before carrying out the related work, professional staff should draw the drawings and make better adjustments according to the actual situation, which is beneficial to the follow-up work, and at the same time, can obtain more accurate data information and continuously optimize the work content. Usually, the higher the accuracy of the drawing content, the more detailed the content, and the easier it is for the staff to work. The staff can find the actual situation of underground reaction through the drawing content, and then find better treatment measures to ensure the accuracy of the data. Under normal circumstances, some problems should be paid attention to in the drawing process: (1) Drawing staff should inspect the field and make constant adjustments according to the geological and climate changes, so as to provide a good information for the staff and improve their work efficiency. (2) In the process of drawing, if there are other working places in the coal mine, it is necessary to mark them with emphasis. When the workers refer to the drawing, they can pay attention to the above points, reduce the occurrence of other problems, and effectively improve the accuracy of data acquisition.

4.5 Improve the Supervision and Management of Coal Mine Survey Technology

To strengthen the monitoring and control of mineral

work, the first thing that needs to be done is to create a standardized management and control plan and specification of surveying and mapping skills for minerals, to create relevant inspection and control departments, to monitor mineral surveying and mapping activities in a timely manner, and to monitor the surveying and mapping work in a planned way. The professional quality of surveying and mapping workers plays a vital role in the smooth progress of surveying and mapping activities. Especially in the complicated terrain and geological environment of minerals, surveying and mapping workers need professional qualities such as not afraid of hardship, being down-to-earth and being responsible, and having excellent technical standards, so as to ensure the safe, effective and accurate implementation of surveying and mapping activities. Therefore, surveying and mapping workers need to carry out relevant professional skills training before they work, and then carry out qualification examination. In addition, the mining companies themselves should be aware of the significance of surveying and mapping activities, which is an indispensable part to ensure the safety of mineral production and enhance the economic benefits of minerals. Generally speaking, on the basis of perfecting and strengthening the supervision and control system of mineral surveying and mapping skills, improving workers' literacy is very useful for mineral surveying and mapping work and the safe production and benign development of the mineral industry.

5. Coal Mine Geological Survey Technology Reform

5.1 Update of Measuring Instruments

Coal mine geological survey in developed countries started early and has a long history of development. In the long-term development, developed countries have established a set of perfect coal mine geological survey system and mastered mature and advanced coal mine geological survey technology. Compared with other countries, China's coal mine geological survey started late, the technology is backward, and the equipment version is lagging behind. In the usual coal mining operations, these factors cannot be ignored, and should be solved with emphasis. As a part of China's non-ferrous mining, coal mines need to be solved for a long time in future geological mining. The continuous development of measuring instruments and technologies has effectively solved this problem and promoted the safe operation of coal mine geological mining. On the whole, the survey work is highly consistent with other engineering surveys, and the general survey

basis must be observed. However, compared with other measurement work, its connotation is richer and its content is more complicated, so the universal measurement basis is no longer applicable, and its implementation must rely on its unique specifications. Different from the past, China's coal mine geological survey instruments are now developing in the direction of intelligence, digitalization, small convenience, the times are progressing, and society is developing. Large and heavy instruments and equipment are destined to be eliminated step by step. Artificial intelligence, multi-function and full-automatic instruments and equipment are expected and will eventually be accepted by the society. However, due to their high price, there is still a long way to go, and China cannot popularize them. With the full automation of the level and total station, the working time is greatly shortened, the working efficiency is improved, time and effort are saved, and the accuracy can also be guaranteed, which is an important guarantee for geological safety production in coal mines.

5.2 The Reform of Measurement Technology

Coal mine geological mining can not be separated from the support of measurement technology, and the accuracy of measurement is directly related to the safety of coal mine geological production. Therefore, people need to constantly improve the measurement technology, upgrade it to meet the needs of social development, and ensure the safety of coal mine geological mining work. In the previous geological survey of coal mines, the survey experience of surveyors was particularly important, because it was the main basis of the survey technology. With the development of society, the previous empirical survey became increasingly old and could not keep up with the development of the times. It could no longer provide technical support for the current geological mining of coal mines, and could not complete the current survey task. However, it is not to say that the traditional technology has been "useless", so that it can be completely rejected and abandoned, and people can learn from each other's strengths. The current measurement technology is digital measurement, which marks the target of coal mine geological area with numbers, completes the accurate calculation of the deformation degree of roadway, monitors the situation of roadway in real time, reduces the frequency of accidents, and can prevent accidents more effectively. Coal mine geological survey technology lasts for a short time, which leads to its imperfect measurement technology system. When faced with new measurement technology, it cannot be updated and used. In order to make great progress in measurement technology, coal mine geological production can be carried out safely, which requires peo-

ple to pay close attention to the development of technology, constantly develop and innovate, and finally apply it to coal mine geological production better.

6. Conclusions

With the progress of modernization in recent years, the demand for coal resources in social production is still great, and the emphasis on safety production is getting stronger and stronger. To ensure coal production, it is also necessary to ensure the safety of coal mine production. Coal mine geological survey is the basic content of underground mining engineering, and it is of great significance to improve the accuracy for ensuring the safety of underground engineering. Therefore, the underground production of coal mine should pay attention to geological survey and strengthen the research of coal mine survey. In fact, the mine should invest advanced technical equipment and professional talents to maximize the measurement accuracy and realize effective control and optimization of the measurement accuracy, thus ensuring the safety of coal mine production.

References

- [1] Tian Feng. the value and importance of geological survey [J]. china petroleum and chemical standard and quality, 2019(15):49 -50.
- [2] Guo linkai. study on characteristics and prevention measures of geological disasters in coal mines [J]. inner Mongolia petrochemical industry, 2019(07): 28-29.
- [3] Cheng Zhiteng. Analysis of the importance of coal mine geological survey in mine safety production [J]. Petrochemical Technology, 2019(07):276 -277.
- [4] Guo qinghuan. key problems in coal mine geological drilling [J]. journal of contemporary chemical research, 2019 (06):35 -36.
- [5] Hu Suoyun. Study on coal mine geological exploration technology and its importance [J]. china petroleum and chemical standard and quality, 2019 (11):211-212.
- [6] Gu Qinghua. analysis of countermeasures to improve coal mine measurement accuracy [J]. technology and market, 2019(3):119-120.
- [7] Liu Jiangbin. Discussion on coal mine measurement methods and countermeasures to improve measurement accuracy [J]. Management and Technology of Small and Medium-sized Enterprises (next issue), 2018(12):145-146.
- [8] Yuan Gang. Measures to improve the accuracy of coal mine geological survey [J]. Inner Mongolia Coal

- Economy, 2018(04) :11-12.
- [9] Wang Jin. Research on measures to improve accuracy in coal mine survey [J]. Mechanical and Electrical Engineering Technology, 2018(02):36-38.
- [10] Wang Wei. Research on coal mine measurement methods and countermeasures to improve measurement accuracy [J]. Energy and Energy Saving, 2018(04):14-15.
- [11] Qi min. an analysis of the application of digital mapping technology in coal mine geological survey [J]. Shandong industrial technology, 2018(02) :5.
- [12] Zhang Hua. Study on the role of geological survey in coal mine safety production and countermeasures [J]. Shandong Coal Science and Technology, 2017 (03):145-146+149.