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CURRENT STATUS AND DEVELOPMENT OF COAL MINE GROUND PRODUCTION SYSTEM AUTOMATION TECHNOLOGY

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Abstract: The composition of the coal mine ground production control system is relatively complex., includes computer software, Telecommunication, computer integrated management and control by and mechatronics and many other technologies. A brief description of the coal mine area surface production Current status and problems of system automation technology, and explore the ground production system traditional development strategy, Hope this provides some guidance and help.
Keywords: Coal mining operations; Automation technology; Ground production system; Current situation; Development strategy

1 INTRODUCTION

With the current various new materials, new technologies, and With the continuous development of new equipment and new processes, China's coal industry production system has continued to develop and improve in recent years, and has jumped out of the traditional labor-intensive production model and shifted to an efficient and intensive production model. The coal industry has thus achieved an efficient and high-yield target, its production efficiency and economic benefits have been significantly improved. As far as coal mine production is concerned, automation technology is an important support for improving coal mine production efficiency. Factors are widely used in domestic coal mine production and have extremely important significance and role.

2 DEVELOPMENT STATUS OF COAL MINE GROUND PRODUCTION SYSTEM AUTOMATION TECHNOLOGY

2.1 Mine Lift Automation

Currently, advanced coal mining countries attach great importance to technologies and equipment related to mine automation. And widely introduce high-power transmission, automation technology and network communication technology to achieve this Automation systems are efficient and safe and reliable operation. on a global scale surround Within the country, the equipment manufacturing technology and industrialization level of Germany's Siemens and Sweden 's ABB are ahead of the international level. Tie system work reliability compare High, the processing technology is relatively excellent, and it is easy to maintain during use [1].
Coal mine hoisting automation control system is an important part of ground production and " The interconnectedness between underground operations " Throat ", and also shouldered the responsibility of coal mine production The transportation of production personnel, machine excavation equipment, materials and coal includes vertical shaft lifting and inclined shaft lifting. The standard for distinguishing the two is whether the shaft is inclined or not. If so, it belongs to the inclined shaft lifting system, and vice versa. Shaft hoisting system, but there is not much difference in the equipment used between the two, including hoist, lifting container, derrick, loading / unloading accessories and roof Wheels, etc.

2.2 Belt Transportation Centralized Control System

Belt transport Since the 20th century Beginning in the 1980s, coal transportation in domestic mines A main operation method, coal mine production efficiency is directly affected by the efficiency and safety of belt conveyor operation.. But in the early days, the equipment and technical level were affected of Limitations, most domestic coal mines adopt local control methods, and the conveyors are equipped with corresponding control systems, which belongs to the decentralized operation mode. Therefore, it causes a large waste of human resources, and the operating environment is poor. It lacks comprehensive fault analysis functions and is difficult to to carry out scientific management. With the development of coal safety production technology and with electricity electricity Sub-technology, computer control technology, industry electricity See The wide application of various high and new technologies represented by technology, network technology and optical fiber communication technology, centralized control of belt transportation in coal mine production The system has also been gradually improved. Such systems have similar design ideas, but the specific technical applications show their own characteristics.. The belt transportation centralized control system supported by automation technology can reduce personnel and increase efficiency. The advantages of reducing the

occurrence rate of failures and improving the availability; while industrial The application of television technology has promoted the perfection and improvement of operation monitoring methods. Operators have a realistic understanding of the operation conditions of belt conveyors. hour Monitoring and grasping, which is crucial to the safety and reliability of coal flow transportation And it is an extremely important guarantee for continuity [2-3].

3 APPLICATION ISSUES OF COAL MINE GROUND PRODUCTION SYSTEM AUTOMATION TECHNOLOGY

3.1 With the Gradual Expansion of Coal Mine Industrial Production Scale

Production system working reliability, technical performance indicators and safety and reliability cannot meet the demand for coal mine production, and its No automated operation Fada long Timely and efficient requirements. This is mainly due to the domestic The theoretical research foundation of automated production systems is insufficient. There is a lack of corresponding practical experience in the process of this sensor and control actuator. practice and inspection methods, and at the same time improve the design concept, process manufacturing as well as There are many problems in testing and inspection.

3.2 The Coal Mine Ground Production System not only Requires Hardware Foundation

Depends on software support, the two must cooperate with each other to ensure System operates efficiently. but At once The current status of coal mine production and development Look, many coal mining companies pay more attention to hardware equipment, while software System construction has been neglected, and most of its construction funds are used for hardware. equipment purchase, there is a large funding gap in developing software, and software should The application is far from perfect, which to a great extent limits the look unfamiliar production system automation. same At present, intelligence is the key to coal mine ground production control. One of the development trends of control systems in the future, currently country inner coal mine There is a common problem of low level of intelligence in surface production systems, and coal Although the monitoring system automation technology applied in mining production meets the Control function requirements, but the system function is biased towards real-time monitoring of data And store historical data, lacking further analysis and processing of data of energy power, and cannot provide decision-making support for coal mine production [4].

3.3 Coal Mine Ground Production System is not Highly Integrated

At this stage, the low integration level of coal mine ground control systems is a problem that deserves attention. key issues. Many coal mine production companies attach great importance to the construction of hardware equipment and invest a lot of money in purchasing advanced production equipment. However, due to unreasonable overall planning, hardware equipment is purchased over a long time span. As a result, this type of equipment is self-contained. Although the technology is advanced, the integration is insufficient, and the coal mine production efficiency has not been significantly improved as expected.

3.4 There are Insufficient Technical Levels in Mechatronics Question

The so-called mechanical integration refers to the organic combination of Oral technology, mechanical technology, Sensor Technology, Electrician Electronic technology, signal conversion technology, micro Electronic technology and information technology, etc., practical process Recommended comprehensive application. But at this stage Domestic coal mine ground production control system There is still the problem of low integration, and further full integration is needed to ensure the effective performance of the ground production control system.

4 EFFECTIVE DEVELOPMENT OF AUTOMATION TECHNOLOGY FOR COAL MINE GROUND PRODUCTION SYSTEMS STRATEGY

4.1 Take Effective Measures to Promote the Construction of Coal

Mine ground production control systems and improve the level of automation. For coal mine ground production control systems, automation is one of the key development directions. current The overall automation level of domestic coal mine ground production control systems is relatively low. Compared with advanced coal mining countries, there are still many shortcomings and need to be further improved. Therefore, we should not only pay attention to learning from the production technology of advanced coal mining countries, We must also pay attention to the improvement of domestic independent development capabilities, accelerate the process of independent research and development on the basis of introducing advanced external technologies, and further promote The automation construction process of domestic coal mine ground production control system.

4.2 Pay Attention to the Development and Research of Sensor Equipment

The development of sensor technology should focus on the following two points: first, take effective measures to extend the service life of the sensor and improve its application reliability; Enable it to adapt to harsh environments and maintain continuous and stable working conditions Secondly, attention should be paid to applying intelligent technology to sensor development, and designing sensors with self-correction, self-diagnosis and the ability to Self-adjusting intelligent sensors.

4.3 Automation and Intelligence

The ground production system is conducive to reducing Low labor intensity, greatly improving production efficiency, so Coal mining companies. The industry should pay attention to the transformation of coal mine ground production control systems and introduce modern modern high-tech to improve its intelligence level and system Central ministries Divide old and injured work equipment to be replaced or reasonably modified to improve its work efficiency and focus on developing data-integrated Processing and analysis functions of System to enhance operational failure prediction as well as Diagnostic capabilities, and can comprehensively collect system operation data and information for people Provide necessary support for industrial decision-making [5].

4.4 Advocate and encourage the introduction of automation technology

To upgrade and transform coal mine ground production control systems to fundamentally improve operating efficiency. Create more impressive results for enterprises economic benefits. In addition, we should also pay attention to the application and development of new technologies, pay attention to new processes, new production equipment and new technologies emerging in the field of coal mine ground production system research, and promote and apply them according to the actual conditions of coal mining enterprises.

5 CONCLUSION

Judging from the current development status of domestic coal surface production systems. The level of automation has improved significantly in the past ten years, and it has gradually entered the direction of regional network informatization and automation. However, relatively Compare in other advanced coal mining State, the automation level of China's coal mine production system is still not small gap, this gap should be given full attention. believe As the rectification work of China's coal industry gradually deepens, the coal industry will also be stable, sustainable and rapid. Move forward to create a good environment and prerequisite for the automation of coal mine ground production systems.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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