

# Problems Existing in The Management of Coal Mine Safety Production Under The New Situation and Solutions

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## ABSTRACT

Four major coal mine accidents, for example, one of coal mine safety production management problems and way to tackle, based on the analysis of the current trend of the development of coal industry in China, on the basis of the objective factors and subjective factors of lead to safety hazard analysis, and the problems existing in the safety management and safety management measures are summarized, do management concept, technology, equipment, creative corporate culture and so on.

## KEYWORDS

Coal mine safety; safety production; business management.

## 1. INTRODUCTORY

China is a vast country with a staggering amount of coal resources in storage, and despite the government's greater efforts to reduce its reliance on coal resources, coal resources still play an important role in China's energy structure. Therefore, ensuring the safe and effective mining of coal resources is of great significance to the country's economic growth, however, safety accidents are frequent in the process of coal mining, and on December 20, 2019, the State Administration of Coal Mine Safety (SACS) issued a circular on the four major coal mine accidents that occurred in recent times in Shanxi, Shandong, Sichuan, and Guizhou one after another, and in particular, the 2 accidents in Sichuan and Guizhou that took place during the period of the State Council's Safety Commission's special rectification of safety were put forward The Bureau has been severely criticized. Therefore, the four major coal mine accidents as an example to analyze, pay attention to coal mine safety production management, explore the production process errors and problems, find reasonable and effective ways to solve the safety and explore the efficient preventive measures is related to the long-term development of the mine is the most important thing <sup>[1]</sup>.

On November 18, Pingyao Fengyan Coal and Coking Group in Shanxi Province caused a major gas explosion due to mining violations, resulting in 15 people killed and 9 injured; on the 19th of the same month, a spontaneous combustion safety accident occurred in Shandong Energy Group's Liangbaoji Coal Mine, resulting in 11 people trapped; on December 14th, Sichuan Province's Sichuan Coal Group's Furong Group Company had a water penetration accident in a closed small coal mine, resulting in 5 deaths and 13 people trapped; on the 17th of the same month, a tragic gas outburst accident occurred in Anlong County, Guizhou Province, resulting in 16 deaths. On December 14, Sichuan Province, Sichuan Coal Group Furong Group Company in the closed small coal mine water penetration accident, resulting in 5 deaths, 13 people trapped; the same month 17, Guizhou Province, Qianxinan County, Anlong County, Guanglong Coal Mine sudden gas protrusion accidents, accidents caused by the tragedy of 16 people died. The above four coal safety accidents have exposed that some

coal mining enterprises still lack the main responsibility, and the problem of violation of laws and regulations is still serious. Therefore, it is especially crucial to dig into the problems of coal mine safety production management and explore the ways to solve them <sup>[4]</sup>.

## **2. OBJECTIVE CAUSES OF COAL SAFETY PROBLEMS**

### **2.1. Composition of China's energy structure**

According to the exploration results, China's coal reserve is more than  $8 \times 10^{11}$ t. As a big country of coal resources mining and consumption, China is among the top countries in the world. Since the founding of New China, the coal industry has been one of the key industries for the country's rapid development. In recent years, the government has taken several initiatives to reduce the share of coal in the energy composition, however, as of 2018, coal consumption accounts for more than 60% of the energy composition. There are two main reasons behind this phenomenon:

(1) China's vast territory, coal resource reserves are amazing, mines are springing up, and the difficulty of coal mining in areas such as Shanxi and Sichuan is low, so China's reliance on coal resources is extremely high. The four cases of safety accidents above occurred in areas rich in coal reserves.

(2) After the founding of the country, influenced by the former Soviet Union, China's earlier various types of power generation and heating systems rely on coal as a large proportion of the energy supply, even if the development and utilization of nuclear energy and wind energy and other clean energy sources, but still failed to shake the coal resources in China's main position. On the other hand, the supporting equipment for power generation and heating systems has been in use for several years in various cities across the country, and replacing the equipment is cumbersome, difficult and costly.

### **2.2. Our geo-environmental problems**

According to the distribution of coal resources, the coal producing areas are mainly focused on the northern region of China, taking Shanxi and Shandong as an example, not only the geological structure is complicated and variable, but also the climatic environment has a high degree of influence on the environment, which is subject to the two-way interference of the geological environment and the climatic environment, and there are potential safety hazards in the process of coal mining and mining operations. On the other hand, China has a long history of coal mining, China's coal mining has been gradually transformed to the deep mining stage, these factors lead to the process of mining operations face a variety of problems: the geostress environment, the geological environment, and geothermal, groundwater, gas endowment, and so on, so the possibility of the safety problems encountered in the coal mining back to the operation is significantly increased <sup>[5]</sup>.

## **3. SUBJECTIVE CAUSES OF COAL SAFETY PROBLEMS**

### **3.1. Diversity of coal accidents**

Most of the coal resources in the vast area of China are stored at the depth of 800 to 1,500 meters underground, and there are various types of safety accidents that may be encountered in underground coal mining production, due to the complexity of the surface structure where the mine is located. Due to the complexity of the surface structure of the mines, safety incidents such as mine collapses often occur in coal mining due to surface pressure. Moreover, the coal seams are deeper, and the gas content in the mine air is often higher, so a larger proportion of mine safety accidents are caused by the gas factor. On the other hand, the ground temperature of underground rock strata is often high, and in the process of digging and mining, the health of underground workers will be more seriously affected.

### **3.2. Complex composition and low security awareness**

As we all know, due to the special characteristics of the coal industry, the working environment is harsh, the environment is poor, the working intensity is large, the working time is long, except for large state-owned enterprises, many coal enterprises cannot attract a high level of high-tech professionals, the overall safety awareness of the practitioners is weak, there is no professional cultural literacy and operating standards. Generally speaking, the composition of the first-line mining and digging operators in the underground coal mine is very complicated and most of them have mixed cultural qualities, and some of them have not even received professional safety education, and there is no relatively qualified safety precautionary awareness and ability in the production work; coupled with the fact that in the production of mines, they do not follow the operation standard and are only accustomed to the daily experience of the difficult problems encountered in the work of the disposal, which results in the production of In addition, the mine production is not standardized and the risk of safety accidents is further increased. In addition, in order to unilaterally pursue economic benefits, mine managers blindly expand coal production, overload production lines and simplify the safety inspection process in the process of mining and production, which leads to an increased risk of safety accidents <sup>[6]</sup>.

### **3.3. Outdated production equipment and lack of safety facilities**

The nature of China's coal mining enterprises are mainly divided into two kinds of state-run coal mines and private coal mines, state-run coal mines from the production equipment to the safety facilities are more perfect, production management is relatively comply with the norms, supporting facilities and safeguards, external supervision are more in place. But China's vast territory, coal mining enterprises are mostly private small coal mines, however, our government for private small coal mines supervision and inspection efforts are relatively weak. Part of the western part of the small coal mines are still in operation, the equipment is seriously aging, the system is seriously deficient, and even the existence of "black kiln", "black coal", greatly increasing the potential for accidents, and at the same time, due to the part of the private small mines, the violation of the law to accommodate At the same time, because some small private mines, in violation of the law, house criminals and people with disabilities, and use violent means of coercion and other threats to human rights to carry out mining, it is difficult for the official statistics of a large number of miners killed in safety accidents to be effectively counted. However, in some less developed regions, which rely on coal production to increase tax revenue and solve social employment problems, local law enforcement authorities often take a passive attitude toward small-scale mining, making it a long-term safety problem.

## **4. ANALYSIS OF THE CURRENT SITUATION OF COAL SAFETY MANAGEMENT**

As we know from the previous section, compared to China's coal production and consumption, the level of safety management in the coal production process lags behind, and the incidence of safety accidents and million-ton fatality rate is relatively high.<sup>21</sup> Since the beginning of the 21st century, the government has introduced various measures to increase the intensity of inspections and penalties, and coal safety accidents have attracted widespread attention from the society. Both the state and enterprises have taken several measures to manage the safety management of coal production, and the incidence of safety accidents has been significantly improved. However, mine safety accidents have not yet been eradicated.

### **4.1. Failure of basic security management**

For a long time, underground basic safety has been hidden in many basic management factors, such as reporting data and underground drawings are not true, underground monitoring and control system

operation is not in accordance with the norms and regulations, underground personnel positioning system failed to operate normally, underground safety inspection information feedback system is seriously missing. The existence of these basic problems on the one hand is the mine top-level design deficiencies, but also mine supervision and management personnel responsible for the lack of professionalism and safety responsibility caused by the lack of. At the present stage of the coal mining industry, the basic safety management status quo for the contract responsibility system, that is, coal mining production and construction operations are outsourced in sections. However, in this process, the supervisors are often held hostage by the contractors and suppliers, so they often ignore the key aspects of the audit and supervision, which can easily lead to the occurrence of safety accidents.

#### **4.2. Inadequate project management and irrational investment decisions**

At present, there are still many problems in China's coal mining and production process. First, small and medium-sized coal enterprises have mistakes in project investment and management, and some unreasonable investment decisions often appear.

(1) The bidding work is not standardized. Part of the coal project in the early stage of construction and development, will be mining transportation equipment and basic safety equipment for social bidding. However, the enterprise bidding personnel failed to tender before the bidding unit to carry out a detailed assessment of the ability, and even more irregular bidding phenomenon often occurs, all kinds of behavior directly interferes with the final bidding results, and ultimately will affect the construction quality of the project.

(2) At present, China's coal project construction in the investment of misunderstanding. Part of the investment decision is easy to suffer from the interference of the investment purpose, because of the economic benefits and the relevant construction unit abandoned the long-term development of enterprises, resulting in the construction of high-tech projects often lack investment, so the phenomenon of unreasonable distribution of funds management.

(3) Exaggerated evaluation of project feasibility. On the issue of project investment management, the managers of coal enterprises do not have professional analysts and only want to expect optimistic results, thus ignoring the risk assessment of the project. As a result, the scientific analysis of the project has a certain deviation, which often leads to a serious situation of investment loss.

#### **4.3. Inadequate management system and incomplete quality supervision mechanism**

The urgent problem of many coal enterprises is the unsound management system. Under the new situation, coal enterprises need to carry out innovative management of the whole production process, it is necessary to improve the management system, to build an efficient quality supervision mechanism. However, at present, many coal enterprises in China have the problem of not paying enough attention to the quality supervision mechanism in the management system. The government has formulated clear laws and regulations on the quality of supervision and management inspection, due to the local management system is not sound, the enterprise management personnel do not pay enough attention to the management of the person in charge of either in the supervision of awareness and supervision aspects of the lack of.

### **5. EFFECTIVE MEASURES FOR COAL PRODUCTION SAFETY**

The corresponding management and law enforcement departments should, according to the actual situation of the region, measure the production capacity of each local coal mine and coal enterprise's basic situation and technical level, formulate the limit standard reasonably, strictly control the production, and prohibit the excavation volume to exceed the limit. Ensure that coal mining

enterprises and local economic interests are guaranteed and maximize the safety of coal mine production<sup>[9]</sup>.

Coal enterprises pay attention to safety production, increase the investment in safety production, which includes relevant safety equipment, safety production research and safety production management. Safety equipment mainly contains fire prevention and disaster prevention system, gas alarm system and ventilation and air permeability system; the investment in safety production is to improve the technical level of coal mine production safety.

Front-line workers and managers of key positions regularly study and educate their professional knowledge and skills, improve the technical level and safety awareness of the overall personnel of the enterprise, and overall improve the comprehensive quality. Establish a reasonable selection and incentive system. Ensure that the talents get full exercise stage, give full play to the role of the talent of the lead charge.

## **6. EFFECTIVE MEASURES FOR INNOVATIVE MANAGEMENT OF COAL SAFETY**

### **6.1. Innovative management concepts**

Coal enterprises to achieve safe and efficient production, the first is to innovate the management concept. The traditional management concept is no longer suitable for the current development trend of the coal industry under the new situation, there should be appropriate innovations in management concepts, enterprise management concepts should be actively combined with market demand, so that enterprises can survive in the incentive to change the market competition. Secondly, through the market regulation to achieve management and standardization of the coal production process, can improve the management level, promote the improvement of production quality, to meet the market demand.

### **6.2. Innovative production management**

Production management is equally innovative. The traditional production management, coal enterprises are to take the rough management mode, so the production efficiency and cost investment is not proportional. The new situation requires a paradigm shift, and the rough management mode is transformed into an energy-saving mode. Therefore, coal enterprises need to educate and train technicians in key positions, and then select outstanding individuals from among them to provide effective guidance on project management<sup>[11]</sup>. In addition, coal enterprises must also carry out strict control of procurement and logistics, the establishment of assessment and evaluation of body fat, a clear daily work system, the establishment of harmonious and friendly relations between employees, to promote the coordinated development of work, to improve work efficiency and optimize production.

### **6.3. Innovative safety management model**

Safety is the top priority of any production sector in the development link. For this special industry of coal mining, safety management is more important, so the innovation of safety management mode in coal enterprises is responsible for the safety of employees, but also responsible for the development of the enterprise. Through diversified ways, to realize the safe production of the enterprise, enhance the safety awareness of employees, and create a cultural atmosphere of the enterprise. In the actual process of mining production, once a safety accident occurs, to achieve strict accountability, must be in accordance with the law and seriously deal with the relevant person in charge, so that up and down can realize the urgent need for safety production, so that the enterprise staff always tighten the heartstrings of safety production. In addition, regular education and training of staff production safety

knowledge is essential to minimize the production risk, the most appropriate to improve production efficiency, to protect the lives of employees, and promote the positive development of enterprises.

#### 6.4. Innovative Corporate Culture

Enterprise culture is the core competitiveness of an enterprise, is the soul of the enterprise, symbolizing the vigorous vitality of an enterprise, coal enterprises pay enough attention to enterprise culture, and need to make appropriate innovations in enterprise culture [15]. Realize the perfect integration of safety culture and enterprise culture, to promote the healthy development of coal enterprises and enhance the internal cohesion of enterprises. The first line of coal mining is very dangerous, the safety problem always hangs above, the safety problem not only threatens the life of the front-line employees, but also has a significant impact on the long-term development of the enterprise [16-17]. Therefore, safety warning education can be integrated into the corporate culture, starting from the daily norms, from the daily management implementation.

### 7. CONCLUSIONS

Coal mine safety production problems, related to the life and safety of each front-line staff more related to the long-term development of coal enterprises, we need to focus on coal mine safety production, urgent tight grasp of coal safety production management. From the coal enterprise technology, equipment, enterprise culture and so on all-round innovation, to ensure the healthy and stable development of coal enterprises.

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